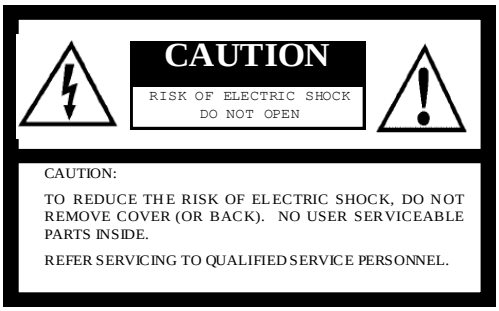
SENTECH

STC-A33A
Application Manual

Small Cubic Type
VGA CCD
Monochrome Analog Camera

Safety Precautions


CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
CAUTION:
TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER SERVICEABLE PARTS INSIDE.
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

For U.S.A.

Warning:

This equipment generates and uses radio frequency energy and if not installed and used properly, I.e., in strict accordance with the instruction manual, may cause harmful interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

For Canada

Warning:

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

WARNING:

TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

Product Precautions

- Handle the camera with care. Do not abuse the camera. Avoid striking or shaking it. Improper handling or storage could damage the camera.
- Do not pull or damage the camera cable.
- During camera use, do not wrap he unit in any material. This will cause the internal temperature of the unit to increase.
- Do not expose the camera to moisture, or do not try to operate it in wet areas.
- Do not operate the camera beyond its temperature, humidity and power source ratings.
- While the camera is not being used, keep the lens or lens cap on the camera to prevent dust or contamination from getting in the CCD or filter area and scratching or damaging this area.
- Do not keep the camera under the following conditions:
    - In wet, moist, and high humidity areas
    - Under hot direct sunlight
    - In high temperature areas
    - Near an object that releases a strong magnetic or electric field
    - Areas with strong vibrations
- Use a soft cloth to clean the camera. Use pressured air spray to clean the surface of the glass. Do NOT scratch the surface of the glass.

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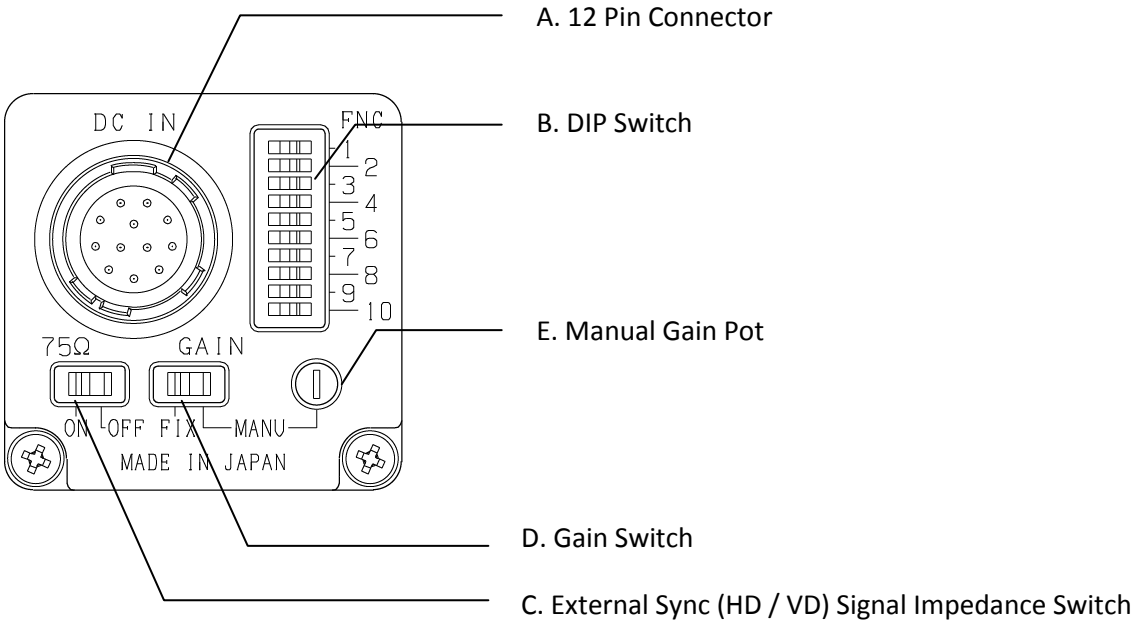
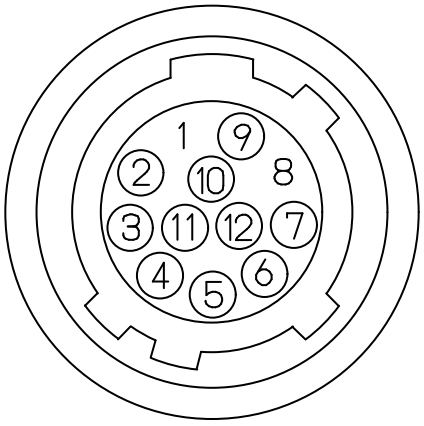
I. Rear Panel Specifications



A. 12 Pin Connector

The connector type: HR10A – 10R – 12PB (Hirose) or equivalent



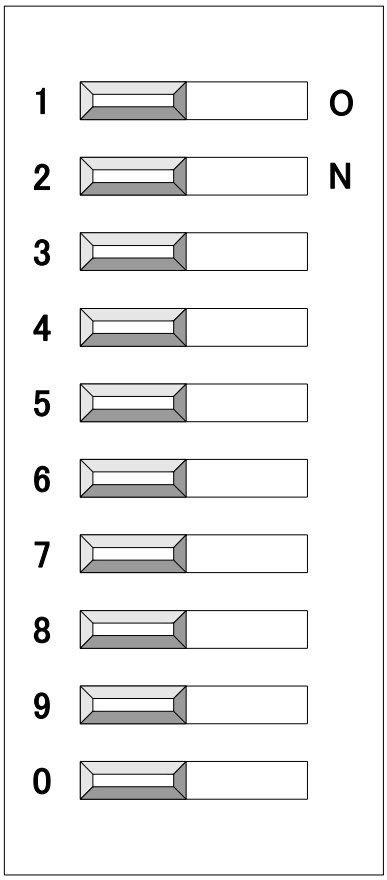
No.	Signal Types	
	Internal Sync	External Sync
1	GND	GND
2	+12V DC	+12V DC
3	VIDEO GND	VIDEO GND
4	VIDEO OUT	VIDEO OUT
5	HD GND	HD GND
6	HD OUT	HD IN
7	VD OUT	VD IN
8	GND	GND
9	TXD	TXD
10	WEN OUT	WEN OUT
11	TRG IN	TRG IN
12	RXD (Note)	RXD (Note)

Note: Pin No.12 can be connected to GND

The camera settings can change by RS232C communication with No. 9 and 12. Please further refer to the details provided in the user's guide.

B. DIP Switch Settings

DIP Switch Settings



No. 1 to 3: Shutter Speed

Shutter Speed	No.1	No.2	No.3
OFF / Pulse Width Trigger	OFF	OFF	OFF
1/200 seconds	ON	OFF	OFF
1/500 seconds	OFF	ON	OFF
1/1,000 seconds	ON	ON	OFF
1/2,000 seconds	OFF	OFF	ON
1/4,000 seconds	ON	OFF	ON
1/8,000 seconds	OFF	ON	ON
1/20,000 seconds	ON	ON	ON

No. 4 to 5: Reset Mode

Reset Mode	No. 4	No. 5
Non-reset	OFF	OFF
V-reset	ON	OFF

No. 6: Trigger Polarity

Trigger Polarity	No. 6
Positive (Rising Edge)	OFF
Negative (Falling Edge)	ON

No. 7 to 8: Scanning Mode

Scanning Mode	No. 7	No. 8
Full Scanning	OFF	OFF
Full Scanning	ON	OFF
1/2 Partial Scanning	OFF	ON
1/4 Partial Scanning	ON	ON

Note: Please use the communication setting when the system needs “Partial Full Scanning” or “Variable Partial Scanning”

No. 9: Sync. System

Sync. System	No. 9
External Sync.	OFF
Internal Sync.	ON

No. 0: Binning Mode

Binning Mode	No. 10
OFF	OFF
ON	ON

C. External Sync (HD / VD) Signal Impedance Switch

External Sync Signal Impedance	
75 Ω termination	ON
High impedance	OFF

D. Gain Switch

Gain Mode	
Fixed Gain	FIX
Manual Gain	MANU

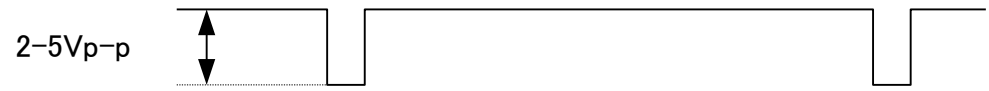
Note 1: The gain can be adjusted by the communication when the fixed gain is selected
Note 2: The gain can be adjusted by the pot (E) on the rear panel when the manual gain is selected.

II. Input / Output Signal Specifications

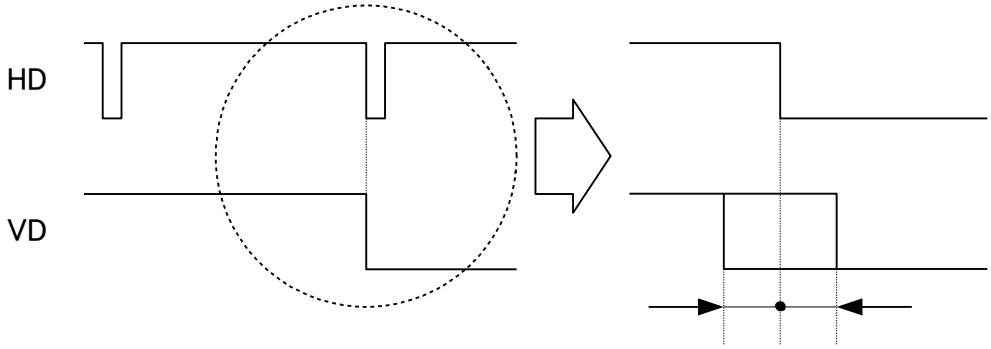
A. Input Signal Specifications

1. External Sync Signals

a. Signal Level: 2.0 to 5.0 Vp-p
b. Termination Impedance: 75 / 10k Ω (Switch Selectable)
c. Signal Polarity: Negative



d. External HD / VD signal input phase tolerance: +/- 8.0 µseconds at 30fps
+/- 4.0 µseconds at 60fps
+/- 2.6 µseconds at 90fps

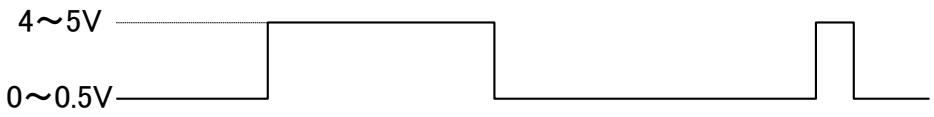


e. Pulse Width: HD: 3.20 +/- 1 µseconds (Low Level)
VD: 4 to 13H (Low Level)
f. Frequency Tolerance of HD Signal: 15. 734 kHz +/- 1% at 30 fps
31.468 kHz +/- 1% at 60 fps
47.674 kHz +/- 1% at 90 fps

2. Trigger Signal

a. Signal Level: Low Level: 0 to 0.5 Vp-p
High Level: 4.0 to 5.0 Vp-p

b. Termination Impedance: 10k Ω



c. Signal Polarity: Rising edge (Positive) / Falling edge (Negative)
(Switch Selectable)

d. Pulse Width: 2 µseconds to 250 mseconds

B. Output Signals Specifications

1. WEN (Write Enable) Signal

a. Signal Level: 3.3 Vp-p at 10k Ω termination
b. Signal Polarity: Negative
c. Pulse Width: 1H (H: Horizontal)

2. HD / VD Signals

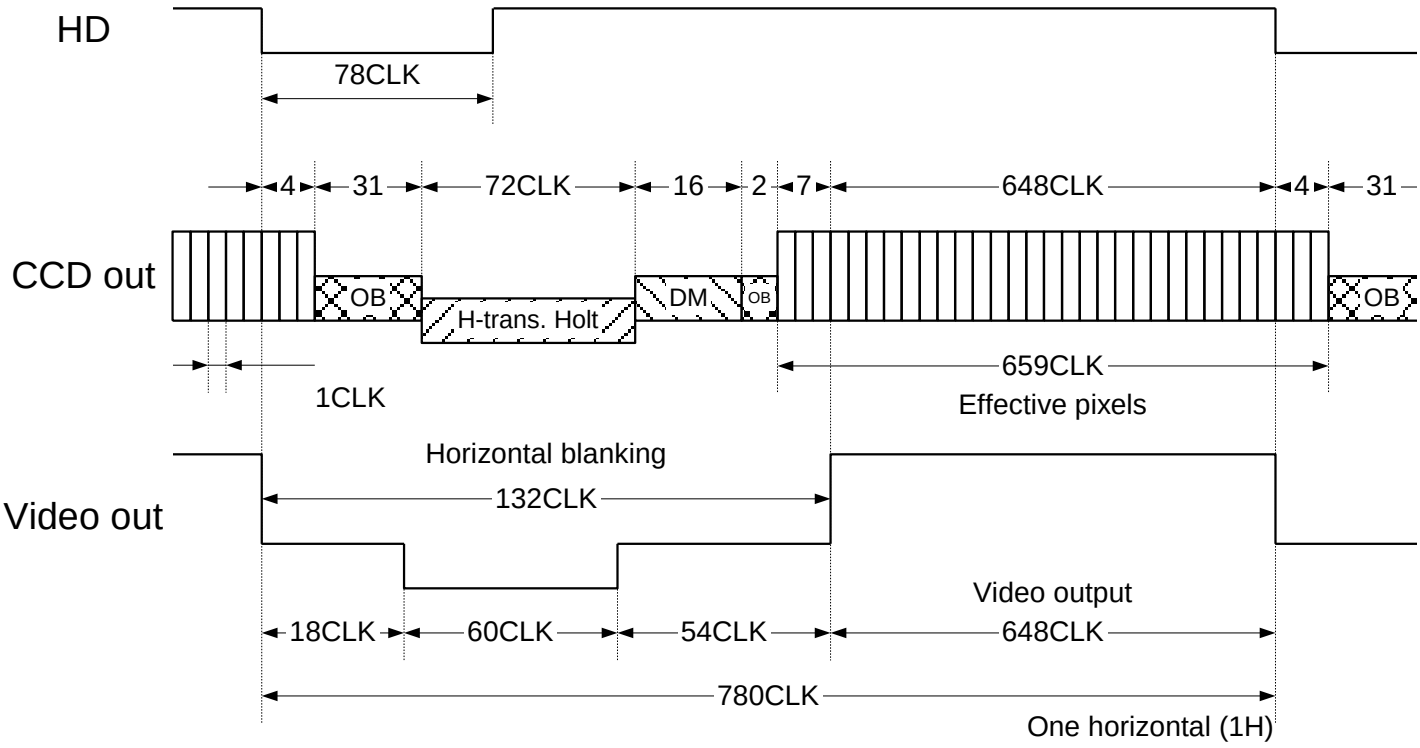
a. Signal Level: 3.3 Vp-p at 10k Ω termination
b. Signal Polarity: Negative
c. Pulse Width: HD: 78clock (clock: pixel clock)
VD: 9H

III. Camera Output Timing Charts

A. Normal Mode (Setting: Address: 10H, Value: 1XX0XXXX)

1. Horizontal Timing

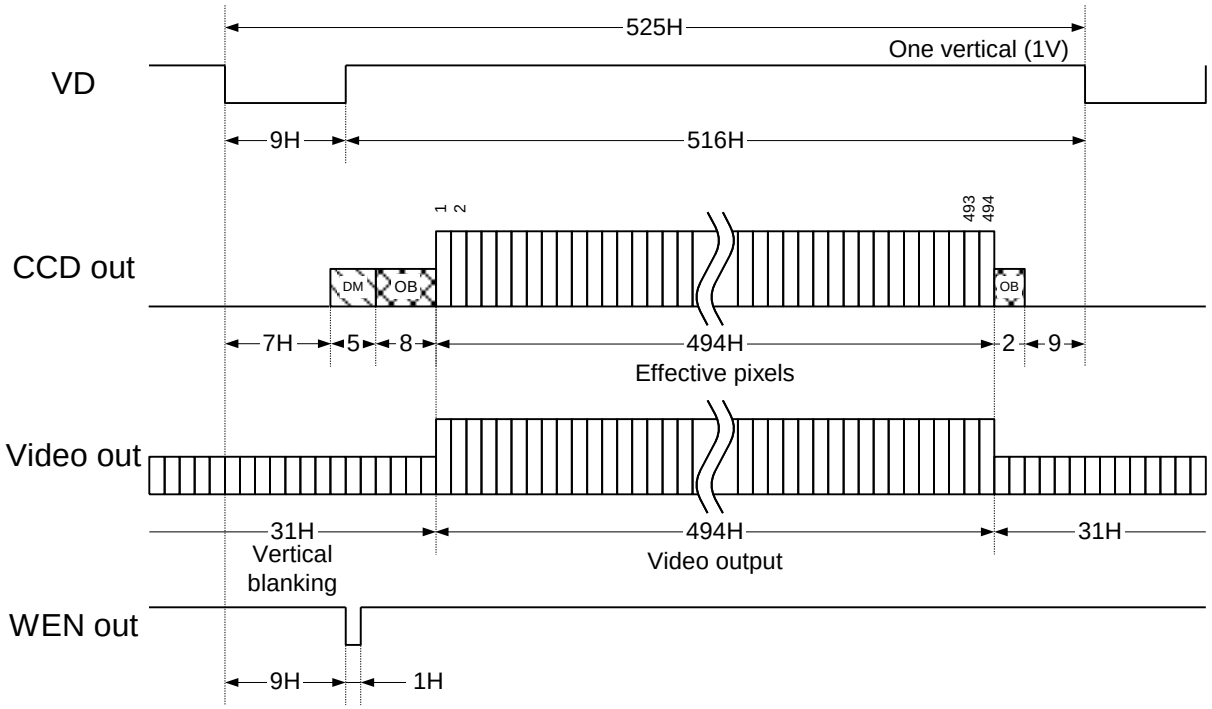
1 CLK = 81.4817 nseconds at 30 fps
1 CLK = 40.7407 nseconds at 60 fps
1 CLK = 27.1606 nseconds at 90 fps



2. Vertical Timing

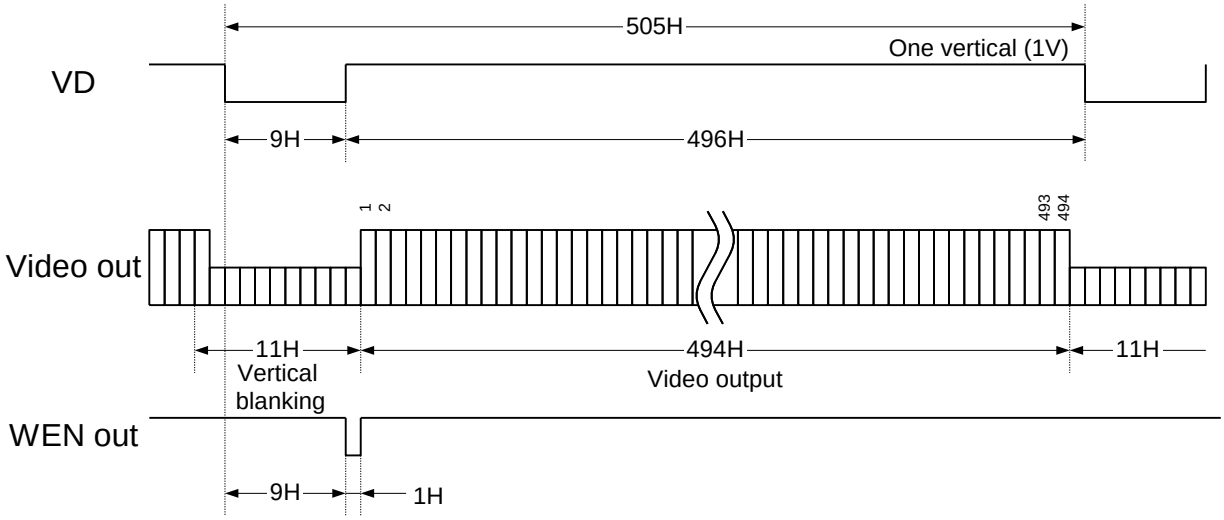
a. Normal Full Scanning (Settings: Address: 10H, Value: 1XX00XXX; Address: 11H, Value: X000X000)

1 H = 63.5556 µseconds, 29.9700 Hz
1 H = 31.7778 µseconds, 59.9400 Hz
1 H = 21.1852 µseconds, 89.9100 Hz



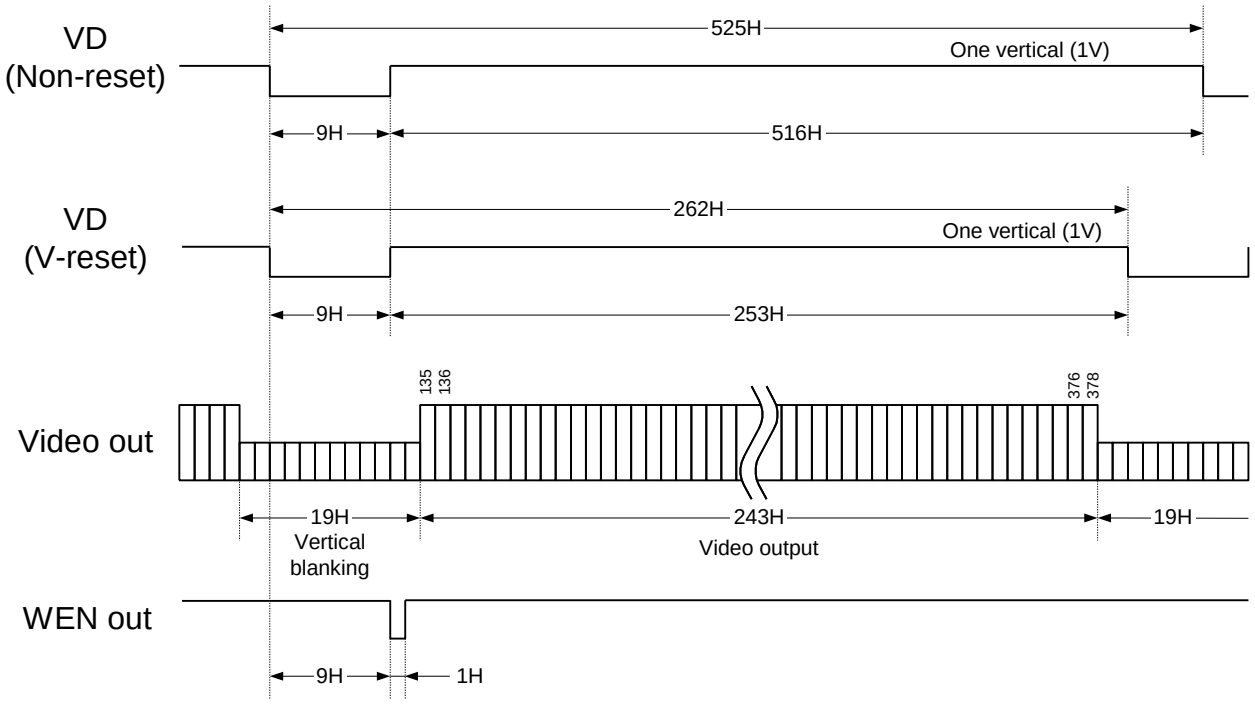
b. Partial Full Scanning (Settings: Address: 10H, Value: 1XX01XXX; Address: 11H, Value: X000X000)

1 H = 63.5556 µseconds, 31.1569 Hz
1 H = 31.7778 µseconds, 62.3138 Hz
1 H = 21.1852 µseconds, 93.4708 Hz



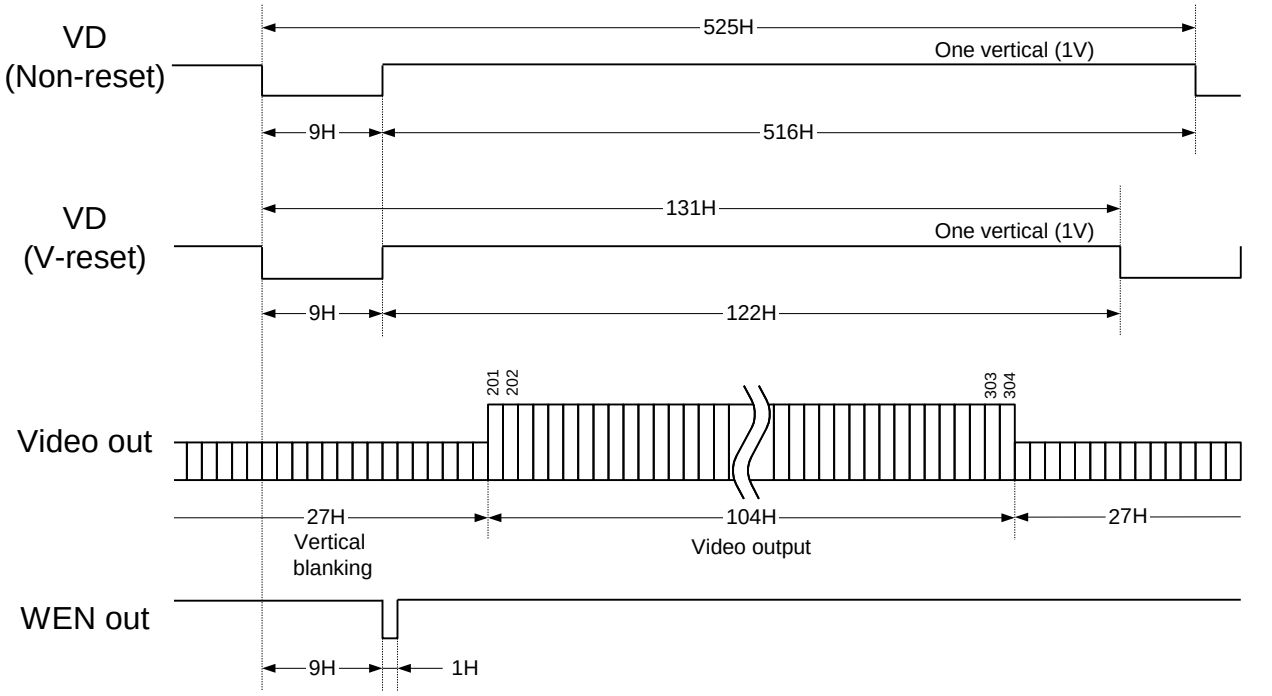
c. 1/2 Partial Scanning (Settings: Address: 10H, Value: 1XX01XXX; Address: 11H, Value: X000X001)

1 H = 63.5556 µseconds, 60.0544 Hz
1 H = 31.7778 µseconds, 120.108 Hz
1 H = 21.1852 µseconds, 180.163 Hz

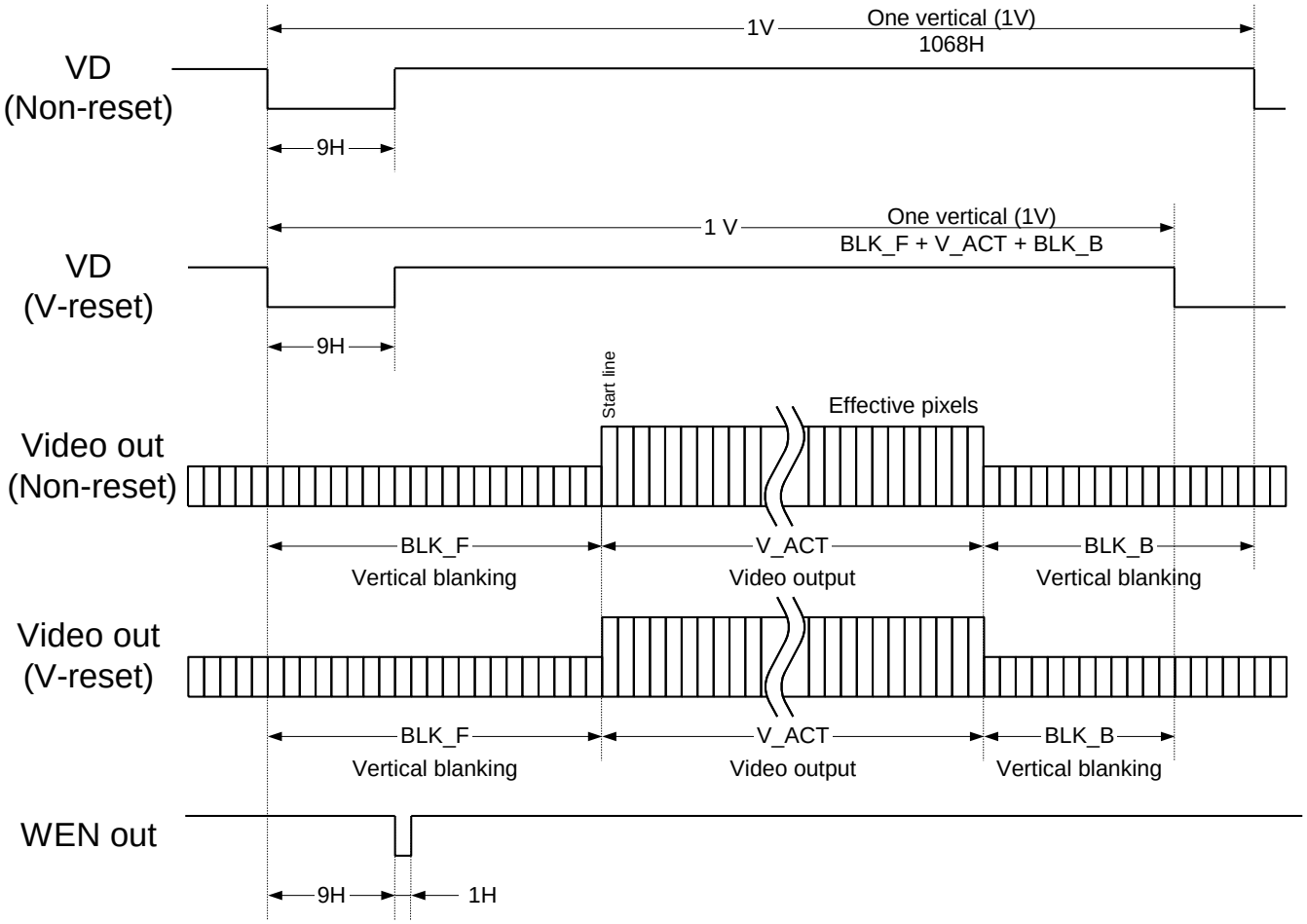


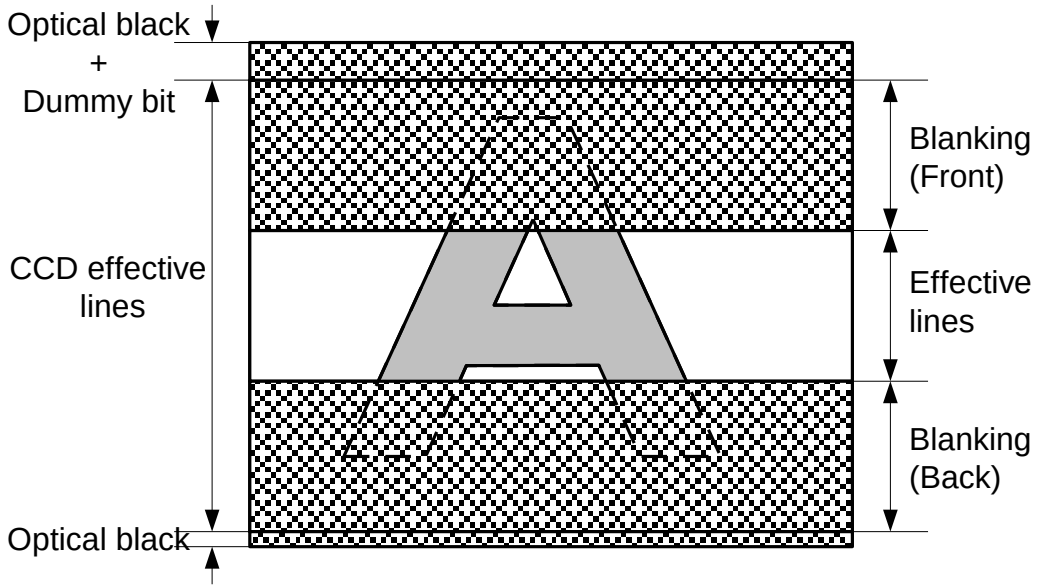
d. 1/4 Partial Scanning (Settings: Address: 10H, Value: 1XX01XXX; Address: 11H, Value: X000X010)

1 H = 63.5556 µseconds, 120.108 Hz
1 H = 31.7778 µseconds, 240.217 Hz
1 H = 21.1852 µseconds, 360.326 Hz



e. Variable Partial Scanning (Settings: Address: 10H, Value: 1XX01XXX; Address; 11H, Value: X000X111)

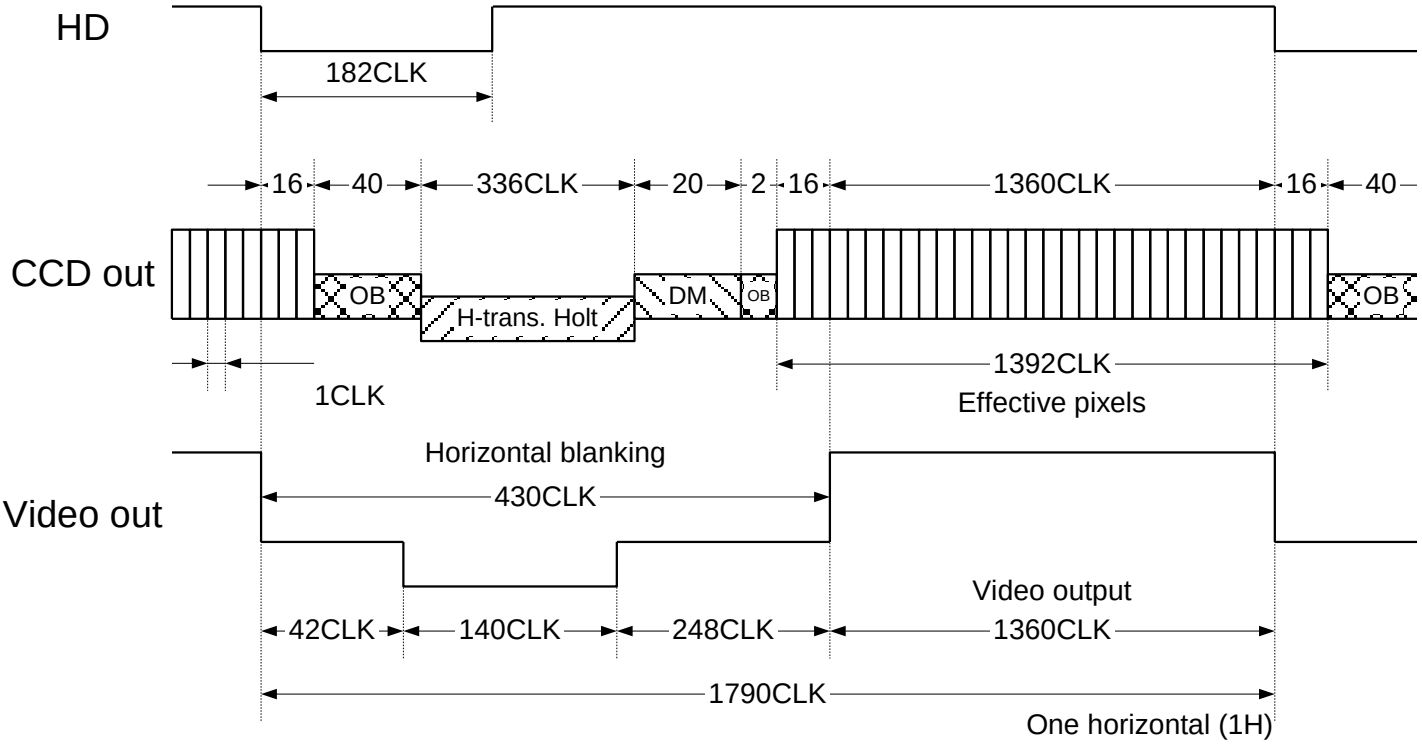




B. Binning Mode (Settings: Address: 10H, Value: 1XX1XXXX)

1. Horizontal Timing

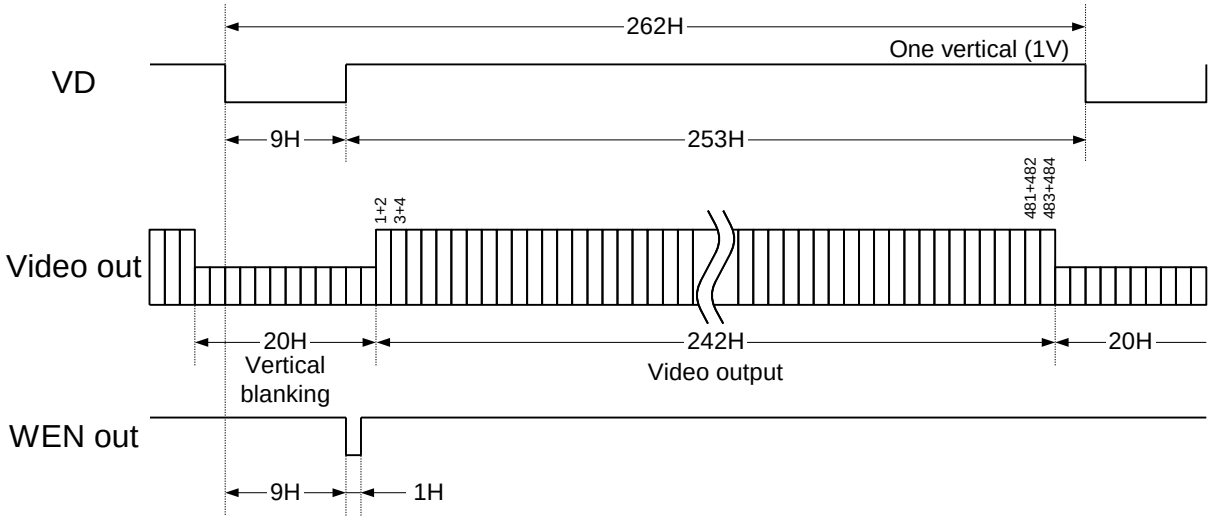
1 CLK = 81.4817 nseconds at 30 fps
1 CLK = 40.7407 nseconds at 60 fps
1 CLK = 27.1606 nseconds at 90 fps



2. Vertical Timing

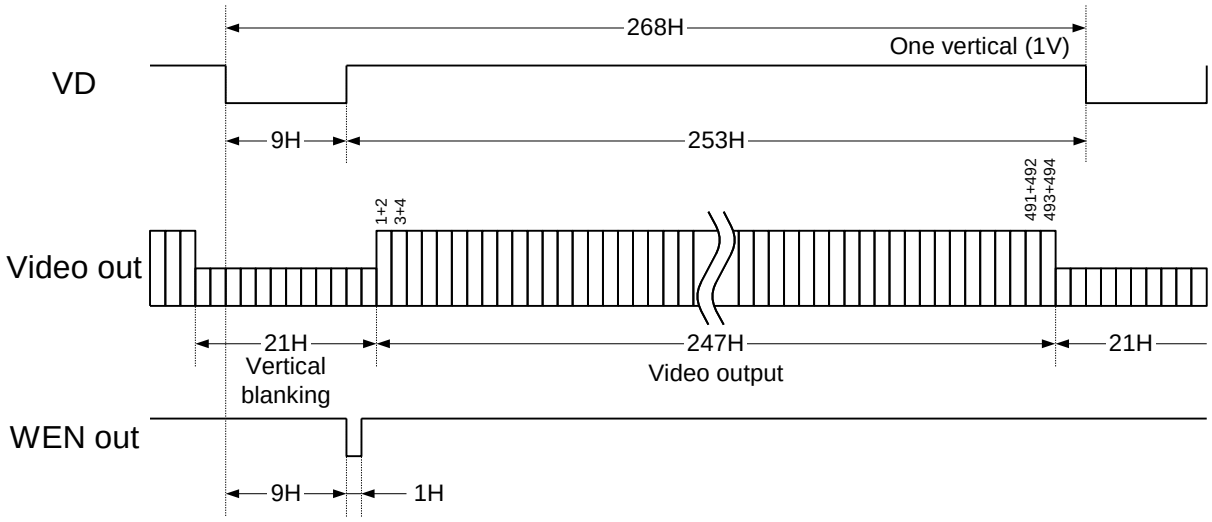
a. Binning Full Scanning (Settings: 10H, Value: 1XX10XXX; Address: 11H, Value: X000X000)

1 H = 63.5556 µseconds, 60.0544 Hz
1 H = 31.7778 µseconds, 120.108 Hz
1 H = 21.1852 µseconds, 180.163 Hz



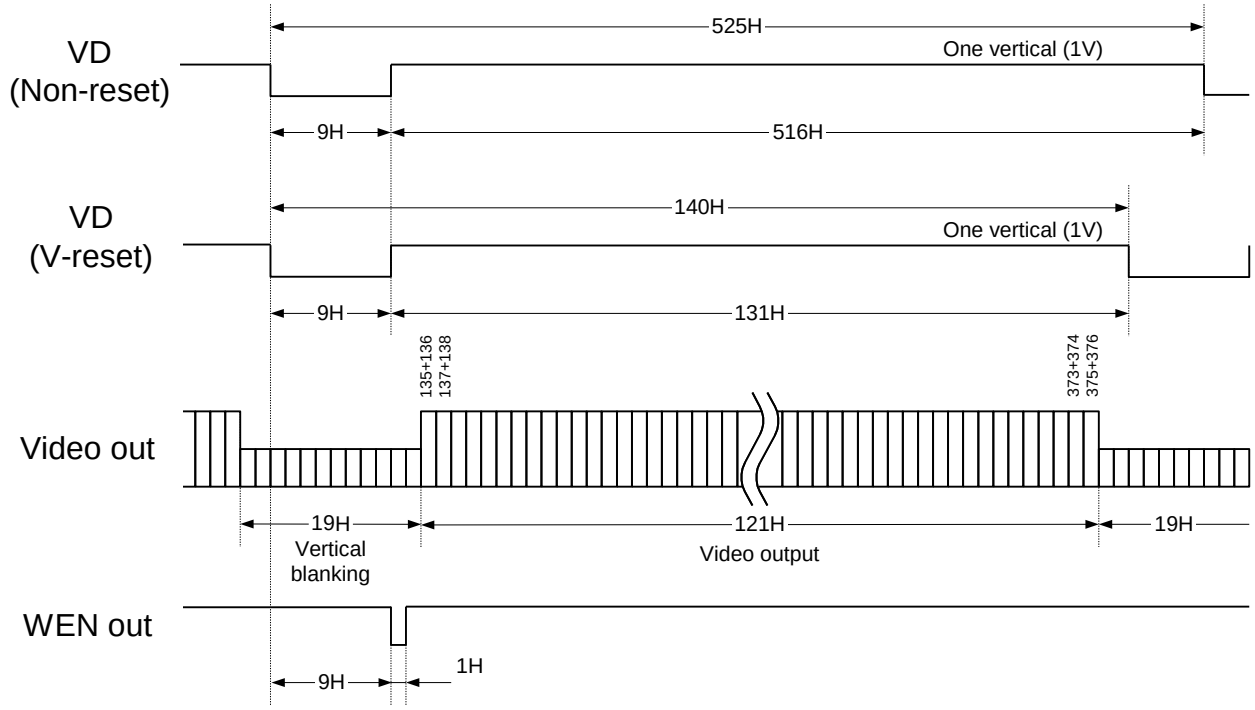
b. Binning Partial Full Scanning (Settings: Address: 10H, Value: 1XX11XXX; Address: 11H, Value: X000X000)

1 H = 63.5556 µseconds, 58.7099 Hz
1 H = 31.7778 µseconds, 117.419 Hz
1 H = 21.1852 µseconds, 176.129 Hz



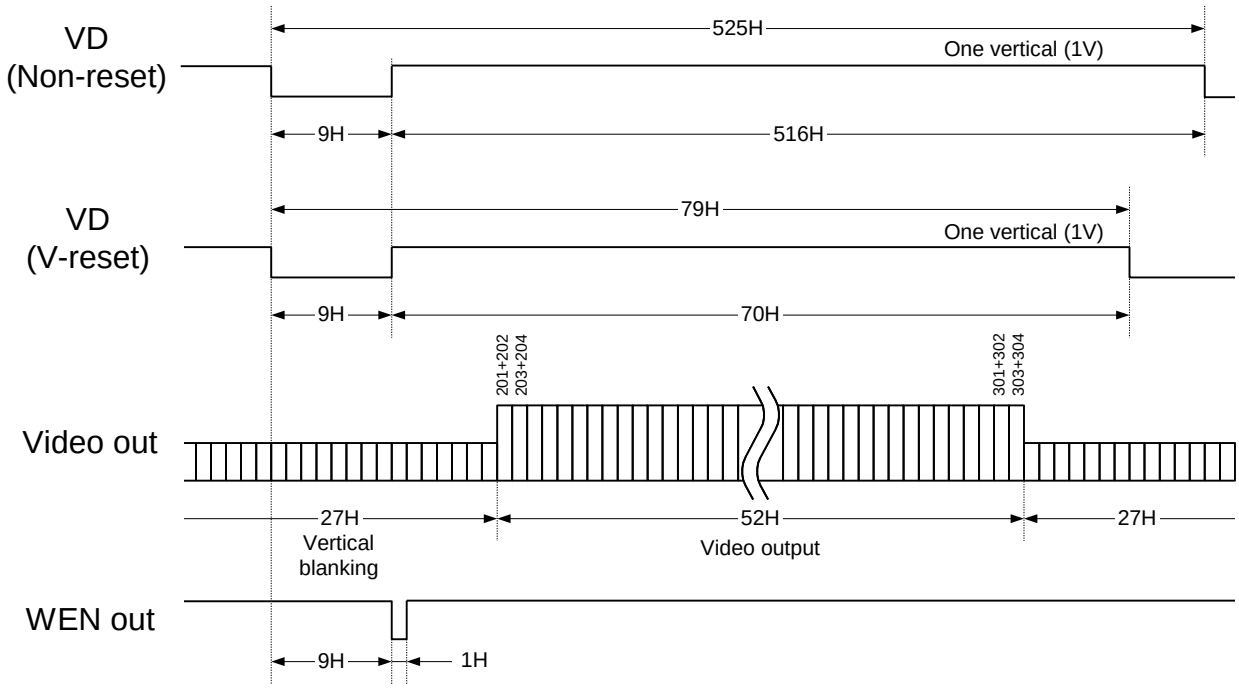
c. Binning 1/2 Partial Scanning (Settings: Address: 10H, Value: 1XX11XXX; Address: 11H, Value: X000X001)

1 H = 63.5556 µseconds, 112.387 Hz
1 H = 31.7778 µseconds, 224.775 Hz
1 H = 21.1852 µseconds, 337.162 Hz



d. Binning 1/4 Partial Scanning (Settings: Address: 10H, Value: 1XX11XXX; Address: 11H, Value: X000X010)

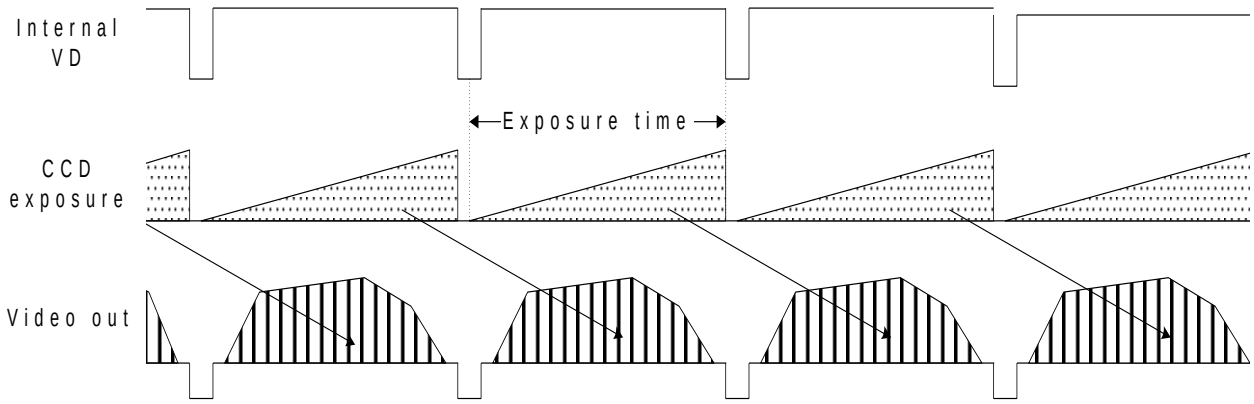
1 H = 63.5556 µseconds, 199.167 Hz
1 H = 31.7778 µseconds, 398.335 Hz
1 H = 21.1852 µseconds, 597.503 Hz



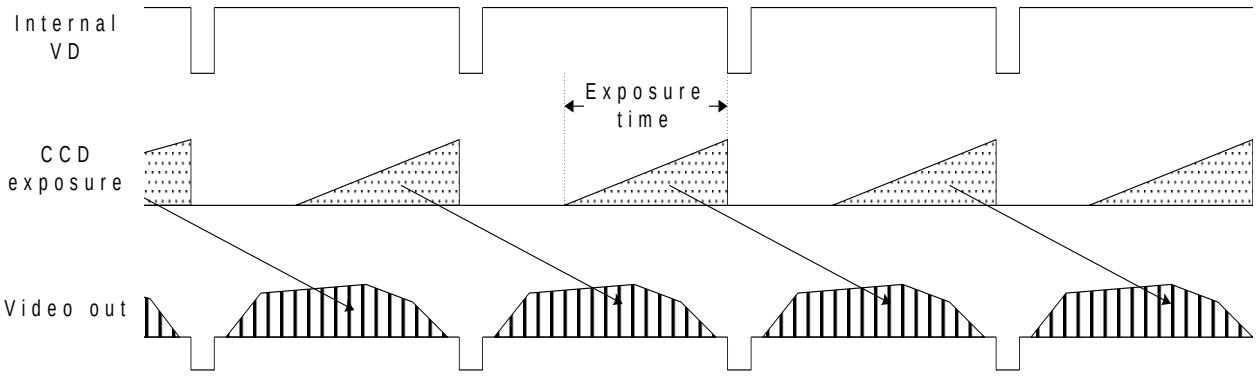
IV. Camera Function Mode

A. Normal Mode

1. Normal Mode (Frame Exposure)



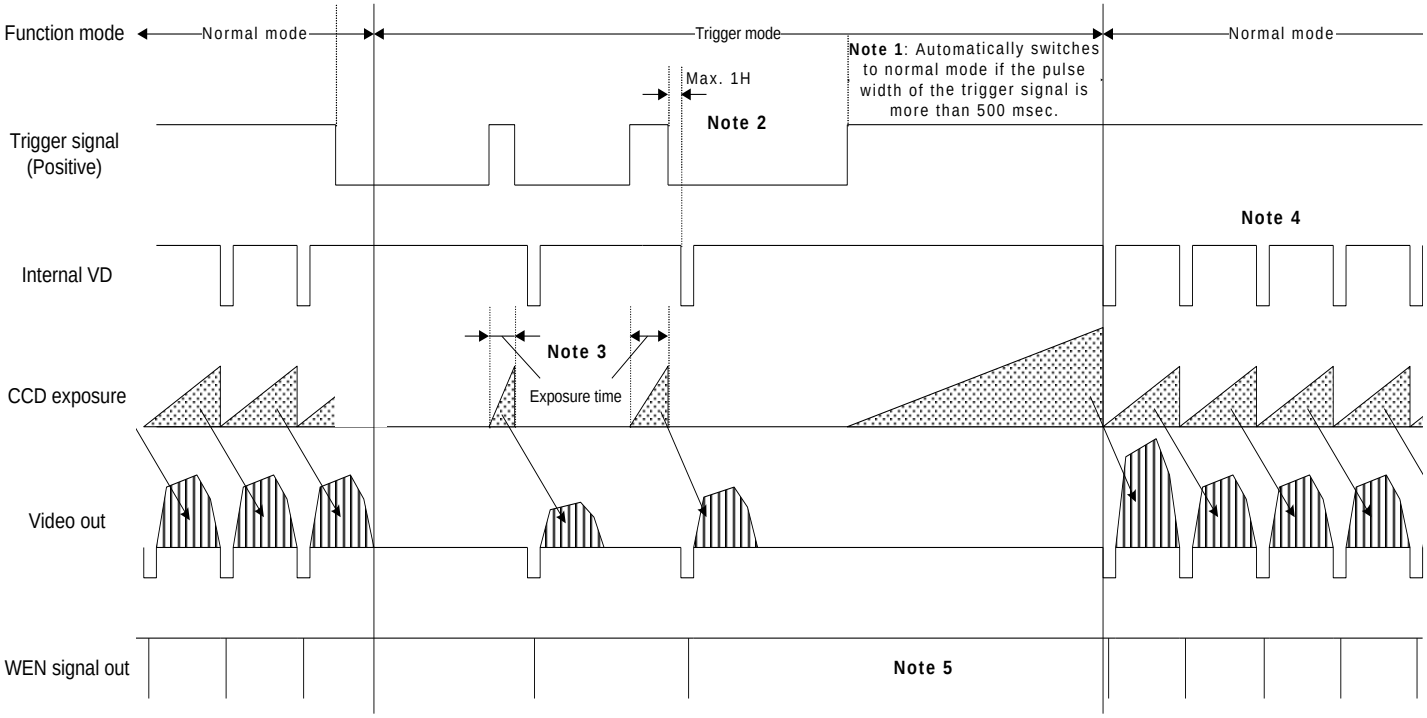
2. Normal Mode (Electronic Shutter)



B. Pulse Width Trigger Mode

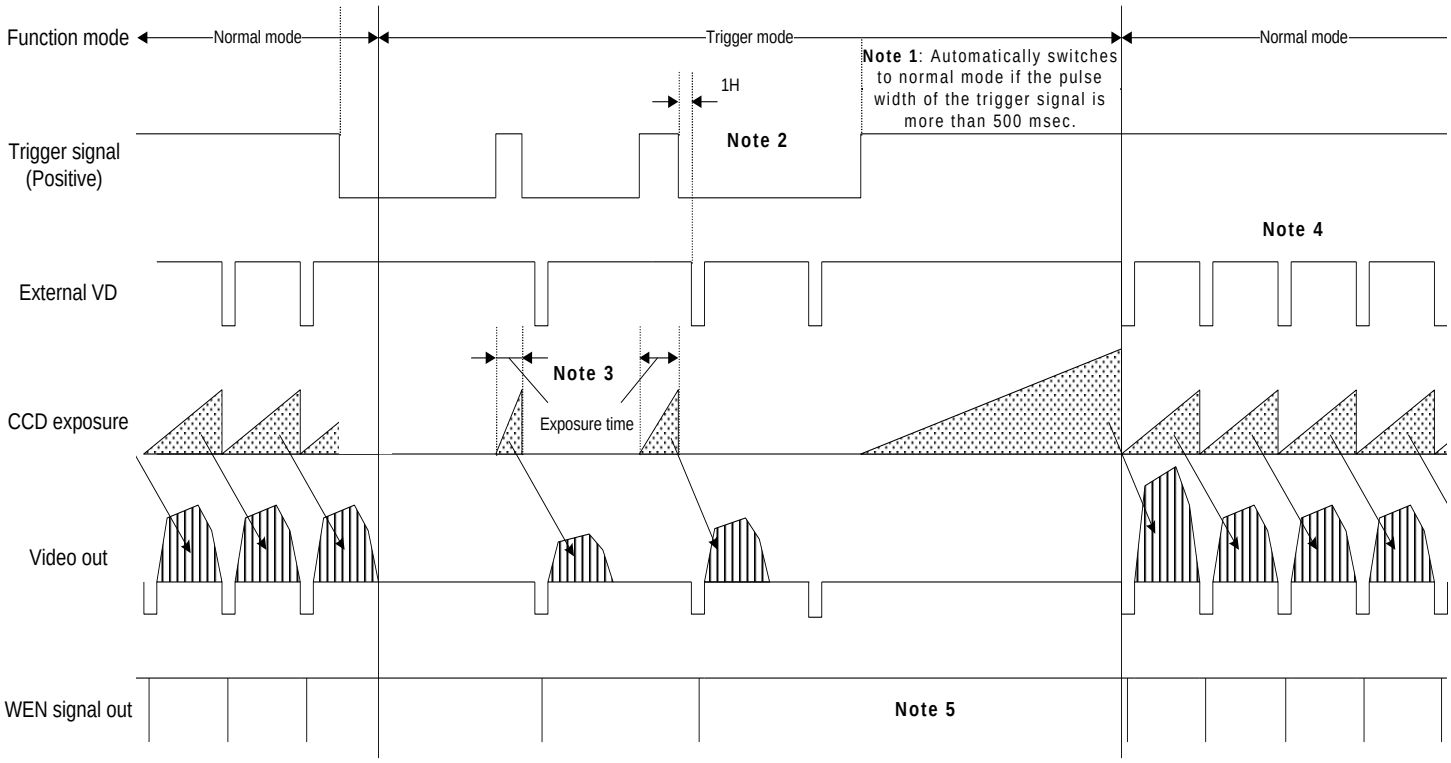
In the “Pulse Width Trigger Mode” with positive polarity, the camera exposure starts at the rising edge of the trigger signal and stops at the falling edge of the trigger signal. Therefore, in the case that the exposure positive polarity is selected, the actual exposure occurs when the trigger signal is at its high state.

1. Pulse Width Trigger Mode (V-Reset)



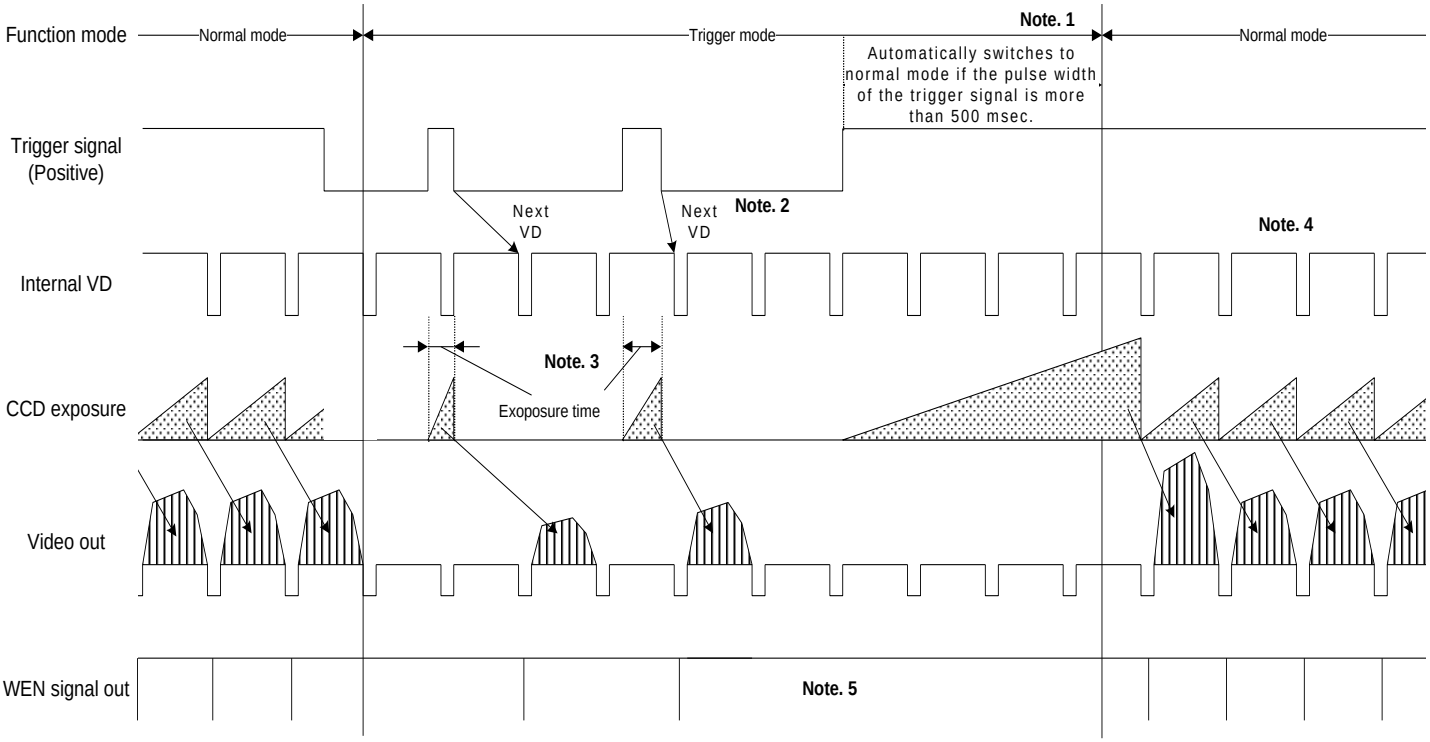
Note 1: The camera does NOT switch to normal mode when the long exposure mode is selected. The timing chart above shows when the long exposure mode is selected.
Note 2: The internal VD signal is reset immediately after the exposure is finished as depicted above; the video output signal is sent out according to that reset VD timing.
Note 3: The exposure time is controlled by the pulse width of the trigger signal.
Note 4: External VD signal input is continuous during the external sync mode and it is disregarded during the trigger mode.
Note 5: The WEN signal does not output when the exposure by the trigger signal does not exist.

2. Pulse Width Trigger Mode (Non-Reset, External Sync)



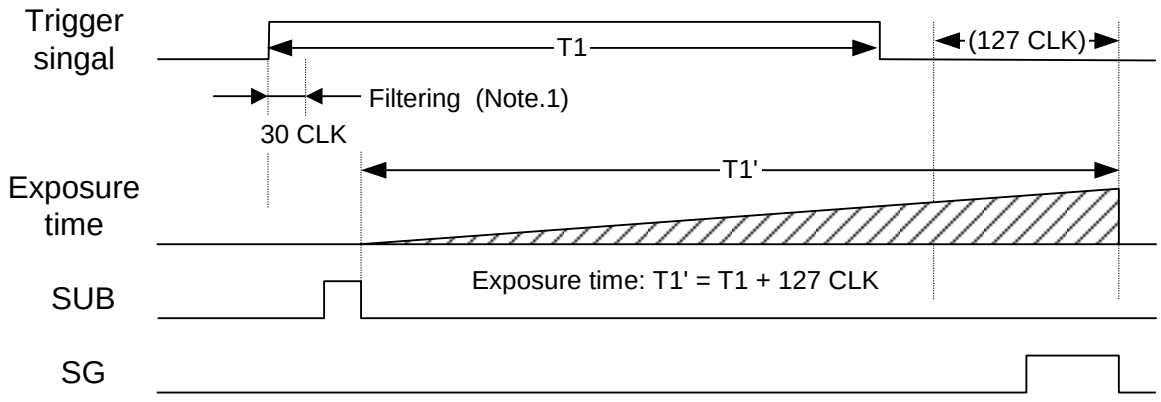
Note 1: The camera does NOT switch to the normal mode when the long exposure mode is selected. This timing chart shows when the long exposure mode is selected.
Note 2: The internal VD signal is reset immediately after the exposure is finished. The video output signal is sent out according to that reset VD timing.
Note 3: The exposure time is controlled by the pulse width of the trigger signal.
Note 4: External VD signal inputs continuously during the external sync mode. External VD signal is disregarded during the trigger mode.
Note 5: The WEN signal does not output when the exposure by the trigger signal does not exist.

3. Pulse Width Trigger Mode (Non-Reset, Internal Sync)



Note 1: The camera does NOT switch to the normal mode when the long exposure mode is selected. This timing chart shows when the long exposure mode is selected.
Note 2: The internal VD signal does not reset by the trigger signal. The video output signal is sent out at the next VD timing.
Note 3: The exposure time is controlled by the pulse width of the trigger signal.
Note 4: The external VD signal inputs continuously during the external sync mode.
Note 5: The WEN signal does not output when the exposure by the trigger signal does not exist.

4. Pulse Width Trigger Mode (Exposure Timing)

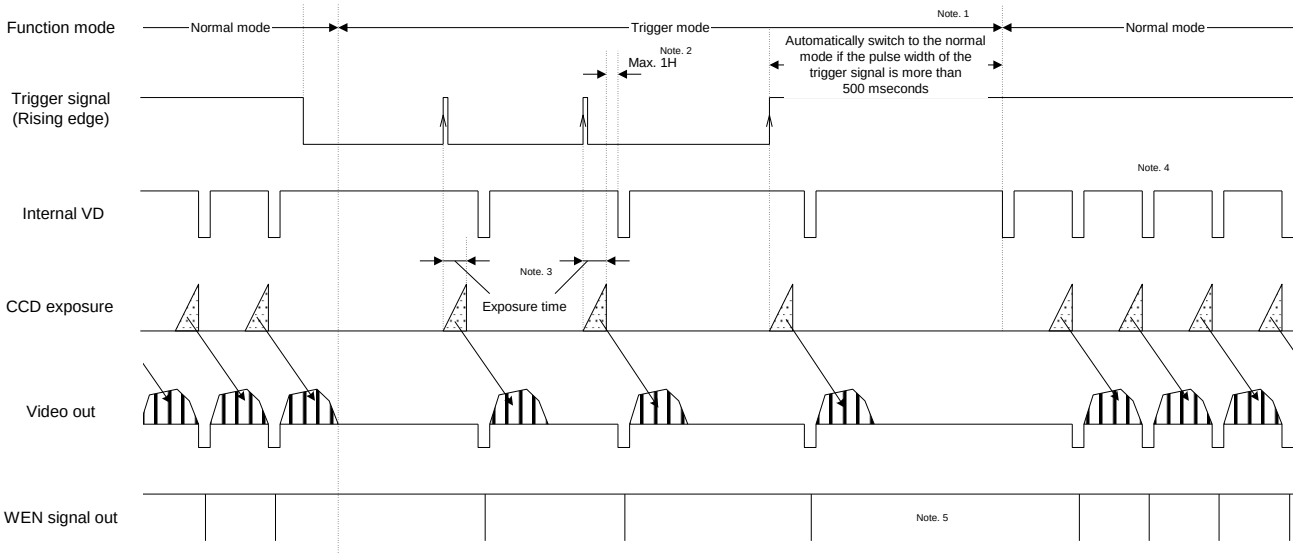


Note 1: The trigger signal that is less than or equal to 30 clocks is removed by the filtering system.
Note 2: The Input trigger signal has to be more than 31 clocks pulse width.
Note 3: The exposure starts 63 clocks after the rising edge of the trigger signal.

C. Edge Preset Trigger Mode

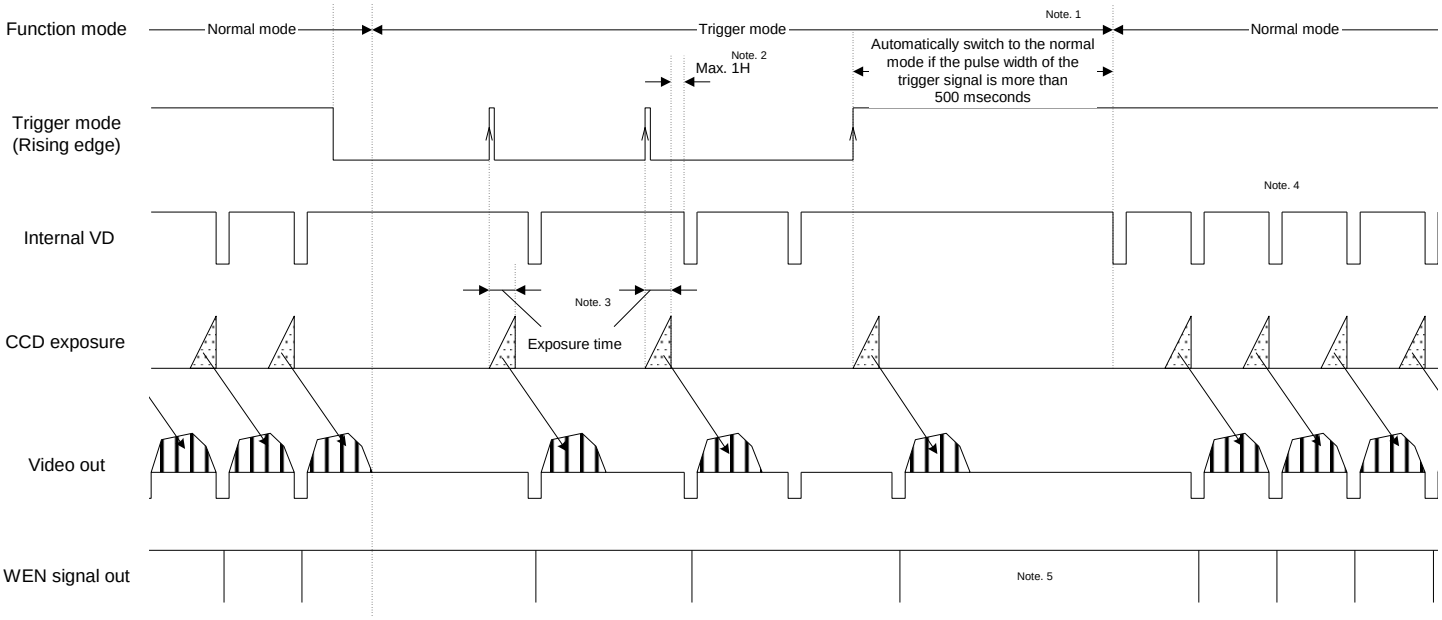
In this “Edge Preset Trigger Mode” with positive polarity, the camera exposure starts at the rising edge of the trigger signal. In this mode, the exposure duration time is based on the preset exposure time (shutter speed) by the camera setting communication or the DIP Switch on the rear panel.

1. Edge Preset Trigger Mode (V-Reset)



Note 1: The camera does NOT switch to the normal mode when the long exposure mode is selected. This timing chart shows when the long exposure mode is selected.
Note 2: The internal VD signal is reset immediately after the exposure is finished; the video output signal is sent out according to that reset VD timing.
Note 3: The exposure time is controlled by the camera setting communication (Refer to the command 20H and 21H) or the DIP Switch on the rear panel as “shutter speed”.
Note 4: External VD signal inputs continuously during the external sync mode. External VD signal is disregarded during the trigger mode.
Note 5: The WEN signal does not output when the exposure by the trigger signal does not exist.

2. Edge Preset Trigger Mode (Non-Reset, External Sync)



Note 1: The camera does NOT switch to normal mode when the long exposure mode is selected. This timing chart shows when the long exposure mode is selected.

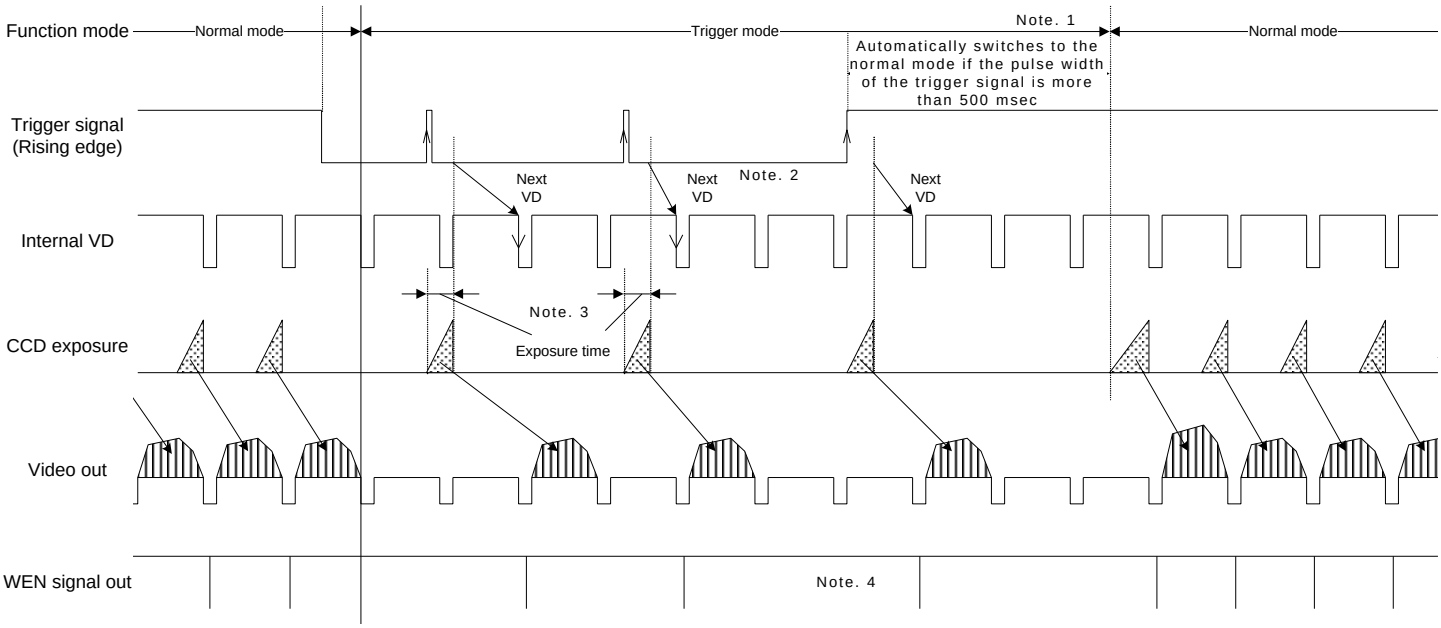
Note 2: The internal VD signal is reset immediately after the exposure is finished; the video output signal is sent out according to the timing of the VD being reset.

Note 3: The exposure time is controlled by the camera setting communication (Refer to the command 20H and 21H) or the DIP Switch on the rear panel as “shutter speed”.

Note 4: External VD signal inputs continuously during the external sync mode. The external VD signal is disregarded during the trigger mode.

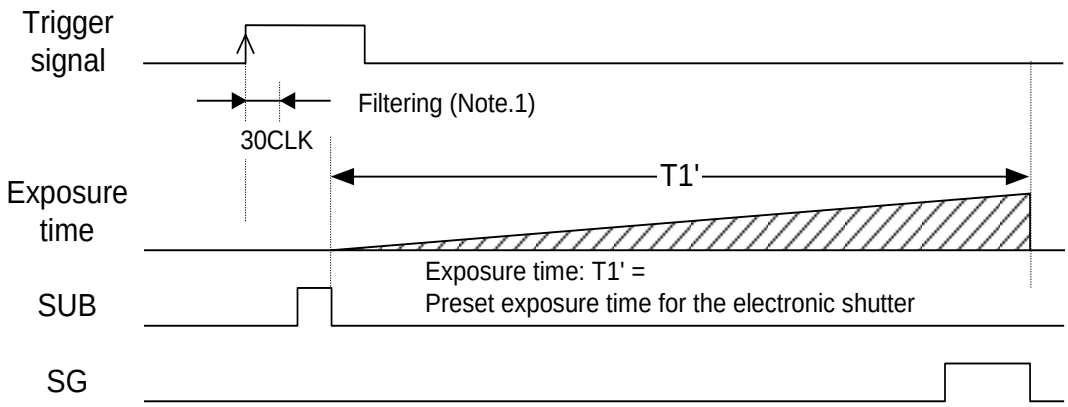
Note 5: The WEN signal does not output when the exposure by the trigger signal does not exist.

3. Edge Preset Trigger Mode (Non-Reset, Internal Sync)



Note 1: The camera does NOT switch to the normal mode when the long exposure mode is selected. This timing chart shows when the long exposure mode selected.
Note 2: The internal VD signal does not reset by the trigger signal. The video output signal is sent out at the next internal reset VD timing.
Note 3: The exposure time is controlled by the camera setting communication (Refer to the command 20H and 21H) or the DIP Switch on the rear panel as “shutter speed”.
Note 4: External VD signal input continuously during the external sync mode. External VD signal is disregarded during the trigger mode.
Note 5: The WEN signal does not output when the exposure by the trigger signal does not exists during the trigger mode.

4. Edge Preset Trigger Mode (Exposure Timing)



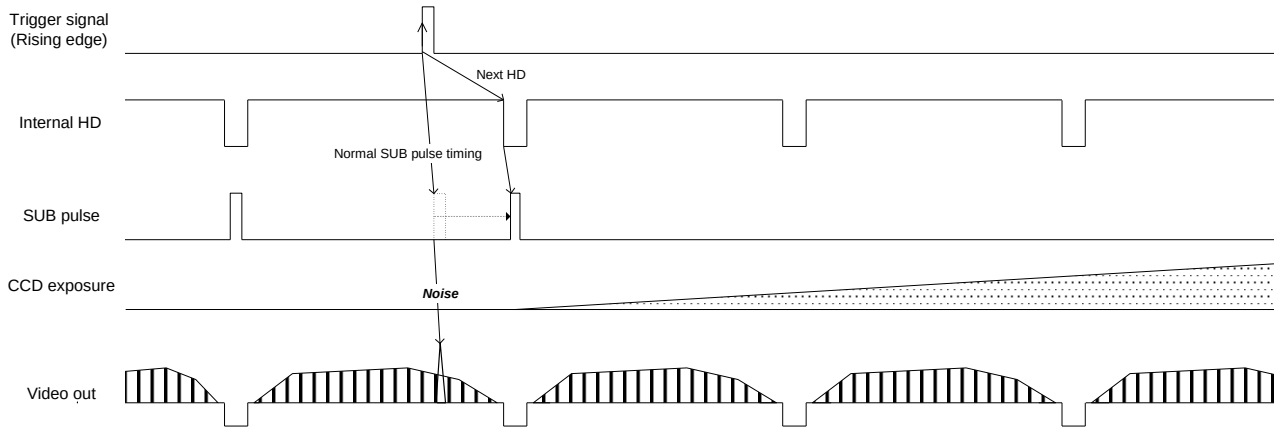
Notes:

- The trigger signal equals to or shorter than 30 clocks is removed by the filtering system.
- The input trigger signal has to be more than 31 clocks pulse width.
- The exposure starts 63 clocks after the rising edge of the trigger signal.

D. H Reset Mode

Normally, the video noise appears when the start of the trigger signal is applied before finishing the video out of the previous frame. This noise is caused by the SUB pulse, which is activated to clear all residual charges on the CCD prior to a new exposure. By selecting “H reset mode”, the camera automatically holds the actual activation of the trigger until the next horizontal blanking period. By doing this, the SUB pulse is activated during the horizontal blanking period and the noise in the image can be avoided.

Note: Due to the principal of this operation, there can be a maximum 1H of delay of the actual trigger signal.



V. Communication Protocol Specifications

This camera has a communication function that enables external devices, such as the PC, to control the camera functions and parameters. Use the “CLCtrl” communication software (version 9.0 or later) to communicate, or follow the communication protocol described below to communicate with the camera.

Note: A communication problem may occur under the following conditions:

- When the external sync frequency is out of the specification (more than 1% off from the specified normal frequency)
- When external sync is unstable.
- Approximately for one second after changing the sync mode.
- Approximately for one second after switching the frame rate.

A. Communication Method
UART (RS232C)

B. Communication Settings

Settings	
Baud Rate	9,600 bps / 38,400 bps
Data Bit	8 bit
Parity	None
Stop Bit	1 bit
Flow Control	None

C. The Communication Format

1. Sending Data Format from the PC to the Camera is shown below:
   a. Sending the read command:

SOF	Device Code	Read / Write	Page Selection	Command Code	Data Length	Data	EOF
8 bit (always 02H)	6 bit	1 bit (always 00H)	1 bit	8 bit	8 bit	8 bit	8 bit (always 03H)

   b. Sending the write command:

SOF	Device Code	Read / Write	Page Selection	Command Code	Data Length	Data	EOF
8 bit (always 02H)	6 bit	1 bit (always 01H)	1 bit	8 bit	8 bit	Data Length Byte	8 bit (always 03H)

2. Receiving data format from the camera is as below:
   a. After sending the reading command:

SOF	Data Length	Data	EOF
8 bit (always 02H)	8 bit	Data Length Byte	8 bit (always 03H)

   b. After sending the write command:

SOF	Data Length	Data	EOF
8 bit (always 02H)	8 bit (always 00H)	8 bit	8 bit (always 03H)

3. Descriptions of the Format:

Name	**Descriptions**
SOF	Start of the frame. The set (or receive) value is always “02H”
Device Code	This indicates the destination of the communication
	The device code for the camera is “000000”. Other codes are the peripheral devices.
Read / Write	This specifies “Read” or “Write” to command numbers. Set 0 for “Read” and 1 for “Write”.
Page Selection	This specifies page selection (access selection) to registers and EEPROM of command. Set 0 to access the command register of the camera. Read command: To read the current data from the command register. Write command: To set the data into the command register. The data in the EEPROM is not replaced. Set 1 to access the EEPROM of the camera Read command: To read the data from the EEPROM Write command: To save the data into the EEPROM as default data Notes: 1. The camera operates with the data in the EEPROM when the camera is powered on. 2. The camera returns the receiving code “01H” to the PC after save the data into the EEPROM. The camera rejects any commands during the data saved (approximately 5 mseconds / byte) and returns the receiving code “07H” (busy) to the PC.
Command Code	This indicates the command. Refer to the following page for the details.
Data Length	This indicates the data length (Unit is byte). Sending data: Set to 0 when sending the read command. The data length is dependent on each write command when sending the write command. Receiving data: The data length is dependent on each write command after sending the read command. Receive “00H” after sending the write command. Receive “00H” when an error has occurred.
Data	This indicates write data or read data according to the command type.
EOF	End of the frame. The set (or receive) value is always “03H”
Receiving Code	This indicates result of the sending command: 01H: Receiving OK (ACK) 10H: Receiving problem (NAC) 07H: The camera is in process (Busy) 11H: Communication problem

D. The Camera Control Command

1. The Camera Command List

Notes:

- The data unit of each command is 1 byte (8bit).
- The data can be saved to the EEPROM if there is “X” in the “Save to EEPROM” column in the below list.
- The camera initializes based on the stored data in the EEPROM when the power is applied.

Command No.	Read / Write	Save to EEPROM	Function	Initial Data	Data Range
00H	Read		Product code (8bit: D[7…0])	17	-
01H	Read		Hardware version (8bit: D[7…0])	ROMdata	-
02H	Read		Firmware version (16bit: D[15…8]) D[15…12]: The integer, D[11…8]: 1st place of the decimal	ROMdata	-
03H	Read		Firmware version 16bit D[7…0]) D[7…4]: 2nd place of the decimal, D[3…0]: 3rd place of the decimal		
04H	Read / Write	X	Serial number (32bit: D[31…24]) D[31…28]: 0, D[27…24]: 7th figure	The factory set value	-
05H	Read / Write	X	Serial number (32bit: D[23…16]) D[23…20]: 6th figure, D[19…16]: 5th figure		
06H	Read / Write	X	Serial number (32bit: D[15…8]) D[15…12]: 4th figure, D[11…8]: 3rd figure		
07H	Read / Write	X	Serial number (32bit: D[8…0]) D[7…4]: 2nd figure, D[3…0]: 1st figure		
08H	Read / Write	X	Customer Code (8bit: D[7…0])	0	-
09 to 0CH	Read / Write		Reserved (Please do not use these)	-	-
0DH	Read / Write	X	The factory adjusted DAC reference voltage value (Back up Data) (8bit: D[7…0])	The factory adjusted value	
0EH	Read / Write	X	The factory adjusted the digital gain value (Backup data) (8bit: D[7…0])	The factory adjusted value	0 to 255
0FH	Read / Write	X	The factory adjusted gain offset value (Backup Data) (8bit: D[7…0])	The factory adjusted value	0 to 63
10H	Read / Write	X	The camera function mode 1 (8bit: D[7…0])	1	
11H	Read / Write	X	The camera function mode 2 (8bit: D[7…0])	0	
12H	Read / Write	X	The camera function mode 3 (8bit: D[7…0])	0	
13H	Read / Write	X	The camera function mode 4 (8bit: D[7…0])	0	
14H	Read / Write	X	The communication mode (8bit: D[7…0])	0	
15 to 1FH			Reserved (Please do not use these)	-	-
20H	Read / Write	X	The exposure time (H) of the electronic shutter (16bit: D[7…0])	0	0 to 4095
21H	Read / Write	X	The exposure time (H) of the electronic shutter (16bit: D[15…8])		
22H	Read / Write	X	The exposure time (CLK) of the electronic shutter (16bit: D[7…0])	0	0 to 779
23H	Read / Write	X	The exposure time (CLK) of the electronic shutter (16bit: D[15…8])		
24H	Read / Write	X	The start line of the variable partial scanning (16bit: D[7…0])	0	0 to 493
25H	Read / Write	X	The start line of the variable partial scanning (16bit: D[15…8])		
26H	Read / Write	X	The effective lines of the variable partial scanning 916bit: D[7…0])	494	0 to 494
27H	Read / Write	X	The effective lines of the variable partial scanning (16bit: D[15…8])		
28H	Read / Write	X	The delay time of the trigger (8bit: D[7…0])	0	0 to 31
29 to 2FH			Reserved (Please do not use these)	-	-
30H	Read / Write	X	CDS gain (8bit: D[7…0])	0	0 to 255
31H	Read / Write	X	The digital gain (8bit: D[7…0])	The value of 0EH address	-

Command No.	Read / Write	Save to EEPROM	Function	Initial Data	Data Range
32H	Read / Write	X	The gain offset (6bit: D[5…0])	The value of 0FH address	-
33 to 37H			Reserved (Please do not use these)	-	-
38H	Read / Write	X	The clamp level (8bit: D[7…0])	4	0 to 31
39 to 5FH			Reserved (Please do not use these)	-	-
60H	Read / Write	X	Control selection (Rear panel / communication) 98bit: D[7…0])	0	-
61H	Read / Write	X	DAC reference voltage (8bit: D[7…0])	The value of 0DH address	-
62H	Read / Write	X	Fixed gain value for the rear panel (8bit: D[7…0])	16	0 to 255
63 to 64H	Read / Write	X	Maximum setting of the pot on the rear panel (16bit: D[15…0])	422	0 to 65535
65 to 6FH			Reserved (Please to do not use these)	-	-
70 to 71H	Read		The current selection on the rear panel (1 bit: D[15])	-	-
72H	Read		The current gain value 98bit: D[7…0])	-	-
73H			Reserved (Please do not use these)	-	-
74 to 75H	Read		Status of the DIP switch on the rear panel (10bit: D[9…0])	-	-
76 to 7DH			Reserved (Please do not use these)	-	-
7EH	Read / Write	X	Firmware version verification (16bit: D[15…8]) D[15…12]: The integer, D[11…8]: 1st place of the decimal	The value of 02H address	-
7FH	Read / Write	X	Firmware version verification (16bit: D[7…0]) D[7…4]: 2nd place of the decimal, D[3…0]: 3rd place of the decimal	The value of 03H address	-
80H	Read / Write		EEPROM control (8bit: D[7…0])	0	0 to 3
81 to FFH			Reserved (Please do not use these)	-	-

2. Descriptions of the Camera Control Commands (The underline settings are factory default settings)

<table>
<tr><th>Command No.</th><th>Command Descriptions</th></tr>
<tr><td>0DH:
DAV_BK[7…0]</td><td>[Back up data of the factory adjusted value for DAC reference voltage]
This data is the factory adjusted DAC reference voltage that is set to the address 61H.</td></tr>
<tr><td>0EH:
DGB_BK[7…0]</td><td>[Back up data of the factory adjusted value for the digital gain]
This data is the factory adjusted digital gain that is set to the address 31H.</td></tr>
<tr><td>0FH:
GOFS_BK[7…0]</td><td>[Back up data of the factory adjusted value for the gain offset]
This data is the factory adjusted gain offset that is set to the address 32H.</td></tr>
<tr><td>10H:
MOD1[7…0]</td><td>[The camera function mode1] Initial data: MOD1[7…0] = 1
This sets the below camera function modes.

D[7…0]
<table>
<tr><td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td></tr>
</table>
<table>
<tr><td>D7:</td><td>Long exposure mode</td><td>0:OFF</td><td>1: ON</td></tr>
<tr><td>D6:</td><td>Trigger polarity</td><td>0: Positive</td><td>1: Negative</td></tr>
<tr><td>D5:</td><td>Trigger mode</td><td>0: Edge preset</td><td>1:Pulse width</td></tr>
<tr><td>D4:</td><td>Binning mode</td><td>0: OFF (Normal)</td><td>1: ON (Binning)</td></tr>
<tr><td>D3:</td><td>Scanning method</td><td>0: Full scanning</td><td>1:Partial Scanning</td></tr>
<tr><td rowspan="2">D2 to D0:</td><td rowspan="2">Reset mode</td><td>000: Non-Reset</td><td>001: V-Reset</td></tr>
<tr><td colspan="2">010 to 111: No function
(Prohibited setting. Do not set these values)</td></tr>
</table></td></tr>
<tr><td>11H:
MOD2[7…0]</td><td>[The camera function mode 2] Initial data: MOD2[7…0] = 0
This sets the below camera function modes.

D[7…0]
<table>
<tr><td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td></tr>
</table>
<table>
<tr><td>D7:</td><td>Sync system</td><td>0: HD/VD signal in (External)</td><td>1: HD/VD signal out (Internal)</td></tr>
<tr><td rowspan="2">D6 to D5:</td><td rowspan="2">Frame rate</td><td>00: 60 fps</td><td>01: 90 fps</td></tr>
<tr><td>10: 30 fps</td><td>11: 60 fps</td></tr>
<tr><td>D4:</td><td>No function</td><td colspan="2">Always set “0”</td></tr>
<tr><td>D3:</td><td>Function mode (Caution)</td><td>0: Trigger</td><td>1: Normal</td></tr>
<tr><td rowspan="3">D2 to D0:</td><td rowspan="3">Scanning mode</td><td>000: Full scanning</td><td>001: 1/2 partial scanning</td></tr>
<tr><td>010: 1/4 partial scanning</td><td>111: Variable partial scanning</td></tr>
<tr><td colspan="2">011 to 110: No function
(Prohibited setting. Do not set these values)</td></tr>
</table>
Caution: 10H. D7, long exposure mode setting and this 11H.D3, function mode, interrelates to each other and the combinations of both settings determine final operation modes of the camera. The functions of the cameras determined by these two settings are summarized as below:
<table>
<tr><td>10H.D7
Long exposure</td><td>11H.D3
Function mode</td><td>Operational mode</td></tr>
<tr><td>1: ON</td><td>0: Trigger</td><td>Trigger mode with the long exposure enable</td></tr>
<tr><td>1: ON</td><td>1: Normal</td><td>Normal (continuous) mode</td></tr>
<tr><td>0: OFF</td><td>0: Trigger</td><td>Trigger mode without long exposure enable (Note)</td></tr>
<tr><td>0: OFF</td><td>1: Normal</td><td>Trigger mode without long exposure enable (Note)</td></tr>
</table>
Note: The camera goes into the normal (continuous) mode automatically when the trigger input lasts more than 500 mseconds.</td></tr>
</table>

<table>
<tr><th>Command No.</th><th>Command Descriptions</th></tr>
<tr><td>12H:
MOD3[7…0]</td><td>
[The camera function mode 3] Initial data: MOD3[7…0] = 0
This sets the following camera function modes.

D[7…0]
<table>
<tr><td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td></tr>
</table>
<table>
<tr><td>D7 to D5:</td><td>No function</td><td colspan="2">Always set “000”</td></tr>
<tr><td rowspan="2">D4 to D3</td><td rowspan="2">Exposure start mode</td><td>00: Normal</td><td>10 to 11 reset,</td></tr>
<tr><td colspan="2">01: No function (Prohibited setting. Do not set these values)</td></tr>
<tr><td>D2:</td><td>No function</td><td colspan="2">Always set “0”</td></tr>
<tr><td rowspan="2">D1 to D0:</td><td rowspan="2">Gamma mode</td><td>00: 1.0</td><td>01: 0.45</td></tr>
<tr><td colspan="2">10 to 11: 1.0</td></tr>
</table>
</td></tr>
<tr><td>13H:
MOD4[7…0]</td><td>
[The camera function mode 4] Initial data: MOD4[7…0] =1
This sets the following camera function modes.

D[7…0]
<table>
<tr><td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td></tr>
</table>
<table>
<tr><td>D7 to D4:</td><td>No function</td><td colspan="4">Set always “0000”</td></tr>
<tr><td rowspan="4">D3 to D0:</td><td rowspan="4">External sync phase adjust</td><td>0111: 7CLK</td><td>0110: 6CLK</td><td>0101: 5CLK</td><td>0100: 4CLK</td></tr>
<tr><td>0011: 3CLK</td><td>0010:2CLK</td><td>0001: 1CLK</td><td>0000: 0CLK</td></tr>
<tr><td>1111: -1CLK,</td><td>1110:-2CLK</td><td>1101: -3CLK</td><td>1100: -4CLK</td></tr>
<tr><td>1011: -5CLK</td><td>1010:-6CLK</td><td>1001: -7CLK</td><td>1000: -8CLK</td></tr>
</table>
</td></tr>
<tr><td>14H:
UART[7…0]</td><td>
[The communication mode] Initial data: UART[7…0] = 0
This sets the following camera function modes.

D[7…0]
<table>
<tr><td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td></tr>
</table>
<table>
<tr><td>D7 to D2:</td><td>No function</td><td colspan="2">Always set “000000”</td></tr>
<tr><td rowspan="2">D1 to D0:</td><td rowspan="2">Baud rate</td><td>00: 38,400bps</td><td>01: 9,600bps</td></tr>
<tr><td colspan="2">10 to 11: No function
(Prohibited setting. Do not set these values)</td></tr>
</table>
</td></tr>
<tr><td>20H:
SVR[7…0]
21H:
SVR[15…8]</td><td>
[The exposure time (H) of the electronic shutter]
Initial data: SVR[15…0] = 0, data range: 0 to 4095
This and SHR[15…0] set the preset shutter speed (or CCD exposure time) for the electronic shutter.

The preset shutter speed is defined by the following formula:
Preset Shutter Speed = SVR[15…0] x (1H cycle time) + SHR[15…0] x (1CLK cycle time)

Notes:
1. The data in 20H through 23H reflects to the present shutter speed.
2. The camera works with the shutter off (maximum shutter speed) when both SVR[] and SHR[] are set to 0.
3. The camera works with the minimum shutter speed when this value is set to 0 and SHR[] is set between 1 and 306.
4. The value replaces by 4095 automatically when this value is set to greater than 4095.
</td></tr>
</table>

Command No.	Command Descriptions
22H: SHR[7…0] 23: SHR[15…8]	[The exposure time (CLK) of the electronic shutter] Initial data: SHR [15…0] = 0, data range: 0 to 779 This and SVR[15…0] set the preset shutter speed (or CCD exposure time) for the electronic shutter. The preset shutter speed is defined by the following formula: Preset Shutter Speed = SVR[15…0] x (1H cycle time) + SHR[15…0] x (1CLK cycle time) Notes: 1. The data in 20H through 23H reflects to the preset shutter speed. 2. The camera works with the shutter off (maximum shutter speed) when both SVR[] and SHR[] are set at 0. 3. The camera works with the minimum shutter speed when this value is set between 1 and 306 and SHR[] is set to 0. 4. The value replaces by 779 automatically when this value is set to greater than 779.
24H: PSR[7…0] 25H: PSR[15…8]	[The start line of the variable partial scanning] Initial data: PSR[15…0] =, data range: 0 to 493 This sets the start line number of the variable partial scanning area. Actual start line of the variable partial scanning = this value + 1 Notes: 1. The camera works with full scanning when the value of (PSR[] + PSW[]) is greater than 494. 2. The value replaces by 493 automatically when this value is set greater than 493.
26H: PWR[7…0] 27H: PWR[15…8]	[The total effective line numbers in the variable partial scanning] Initial data: PWR[15…0] = 494, data range: 0 to 494 The sets the number of the total effective lines (the image height) in the variable partial scanning. Notes: 1. The camera works with full scanning when the value of (PSR[] + PSW[]) is greater than 494 or this value is set to 0. 2. The value is replaced by 494 automatically when this value is set to greater than 494.
28H: DLY [7…0]	[The delay time for the trigger] Initial data: DLY[7…0] = 0, data range: 0 to 31 This sets the delay time for the input trigger signal to the start of the exposure. Delay time is defined by the following formula: Delay Time = 148CLK x DLY[7…0] (Unit is useconds) Note: CLK = pixel clock time is useconds
30H: PGA[7…0]	[The CDS gain] Initial data; PGA[7…0] = , data range: 0 to 255 This sets the CDS gain, which is the programmable gain. CDS gain is defined by the following formula: CDS Gain = 3.64 + 0.132 x (PGA[7…0] + GOFS[7…0]) (Unit is dB) The analog gain of CCD output is defined by the DCS gain as shown below: Analog gain = pre-amp (6 dB) + CDS gain (Unit is dB)

<table>
<tr><th>Command No.</th><th>Command Descriptions</th></tr>
<tr><td>31H:
DGB[7…0]</td><td>[The digital gain] Initial data: DGB[7…0] = The value in the address 0EH, data range: 0 to 255.
This sets the digital gain.

The video output level is defined by the following formula:
Video output level = (Input video level –CLAMP[7…0] x (1 + (DGB[7…0] / 128) + CLAMP [7…0])

Notes:
1. GOFS[7…0]: The gain offset, which is the value in the address 32H.
2. CLAMP[7…0]: The clamp level, which is the value in the address 38H.</td></tr>
<tr><td>32H:
GOFS[7…0]</td><td>[The gain offset] Initial data: GOFS[7…0] = The value in the address 0FH, data range: 0 to 63
This sets the gain offset.</td></tr>
<tr><td>38H:
CLAMP[7…0]</td><td>[The clamp level] Initial data: CLAMP[7…0] = The value in the address 0FH, data range: 0 to 63.
This sets the gain offset.</td></tr>
<tr><td>60H:
SW COM[7…0]</td><td>[Control selection (Rear panel / communication)] Initial data: SWCOM[7…0] = 0
This sets the following control selections.

D[7…0]
<table><tr><td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td></tr></table>
<table><tr><td>D7 to D2:</td><td>No function</td><td colspan="2">Always set “000000”</td></tr><tr><td>D1:</td><td>Control selection</td><td>0: DIP switch on the camera</td><td>1: Communication</td></tr><tr><td rowspan="2">D0:</td><td rowspan="2">Gain switch</td><td>0: Enable
(Gain mode is selectable by the switch on the rear panel)</td><td></td></tr><tr><td colspan="2">1: Disable
(Fixed gain is adjustable by the communication)</td></tr></table></td></tr>
<tr><td>61H:
DA_VREF[7…0]</td><td>[DAC reference voltage]
Initial data: DA_VREF[7…0] = the value of the address 0DH, data range: 0 to 255
This sets the reference voltage for the DAC.</td></tr>
<tr><td>62H:
FIX_GAIN[7…0]</td><td>[Fixed gain for the rear panel] Initial data: FIX_GAIN[7…0] = 16, data range: 0 to 255
This sets the gain for the fixed gain on the rear panel.

0:6.544 dB, 255: 40,204 dB</td></tr>
<tr><td>63H:
VR_MAX[15…8]
64H:
VR_MAX[7…0]</td><td>[Maximum setting of the pot on the rear panel]
Initial data: VR_MAX[15…0] = 422, data range: 0 to 65535
This sets the maximum gain for the pot on the rear panel for the manual gain.</td></tr>
<tr><td>70H:
GAIN[15…8]
71H:
GAIN[7…0]</td><td>[The current gain selection on the rear panel / the current pot position on the rear panel]
This obtains the status of the gain selection and manual gain on the rear panel.

D[15…0]
<table><tr><td>D15</td><td>D14</td><td>D13</td><td>D12</td><td>D11</td><td>D10</td><td>D9</td><td>D8</td><td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td></tr></table>
<table><tr><td>D15:</td><td>Gain mode</td><td>0:Manual gain</td><td>1: Fixed gain</td></tr><tr><td>D14 to D0:</td><td>Manual gain</td><td></td><td></td></tr></table></td></tr>
</table>

<table>
<tr><th>Command No.</th><th>Command Descriptions</th></tr>
<tr><td>74H:
DSW_ST[9…8]
75H:
DSW_ST[7…0]</td><td>
[Status of the DIP switch on the rear panel]
This obtains the status of the DIP switch on the rear panel.

D[9…0]
<table>
<tr><td>D9</td><td>D8</td><td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td></tr>
</table>
<table>
<tr><td>D9:</td><td>Binning mode</td><td>0: ON (Binning)</td><td>1: OFF (Normal)</td></tr>
<tr><td>D8:</td><td>Sync system</td><td>0: HD/ VD signals in (External)</td><td>1: HD/VD signals out (Internal)</td></tr>
<tr><td>D7 to D6:</td><td>Scanning mode</td><td>00: 1/4 partial scanning</td><td>01: 1/2 partial scanning</td></tr>
<tr><td></td><td></td><td>10 to 11: Full scanning</td><td></td></tr>
<tr><td>D5:</td><td>Trigger polarity</td><td>0: Negative</td><td>1: Positive</td></tr>
<tr><td>D4 to D3:</td><td>Reset mode</td><td>10: V-Reset</td><td>11: Non-Reset</td></tr>
<tr><td>D2 to D0:</td><td>Shutter speed</td><td>000: 1/20,000 seconds</td><td>001: 1/8000 seconds</td></tr>
<tr><td></td><td></td><td>010: 1/4,000 seconds</td><td>011: 1/2000 seconds</td></tr>
<tr><td></td><td></td><td>100: 1/1000 seconds</td><td>101: 1/500 seconds</td></tr>
<tr><td></td><td></td><td>110: 1/200 seconds</td><td></td></tr>
<tr><td></td><td></td><td>111: Shutter off, pulse width trigger</td><td></td></tr>
</table>
</td></tr>
<tr><td>7EH:
FWVR[15…8]
7FH:
FWVR[7…0]</td><td>
[Firmware version verification] Initial data: FWVR[15..0] = Firmware version
This is used for the firmware version verification when the camera is powered on.
The data of the address 10H to 7FH on the EEPROM are initialized with the factory default if this and the value on the register are not equal.
</td></tr>
<tr><td>80H:
E2P[7…0]</td><td>
[EEPROM control] Initial data: E2P[7…0] = 0
This sets the EEPROM control mode.

D[7…0]
<table>
<tr><td>D7</td><td>D6</td><td>D5</td><td>D4</td><td>D3</td><td>D2</td><td>D1</td><td>D0</td></tr>
</table>
<table>
<tr><td>D7 to D2:</td><td>No function</td><td colspan="2">Always set “000000”</td></tr>
<tr><td>D1:</td><td>Register simultaneously updates with the EEPROM</td><td>0: Prohibited</td><td>1: Permitted</td></tr>
<tr><td>D0:</td><td>Writing control into EEPROM</td><td>0: Prohibited</td><td>1: Permitted</td></tr>
<tr><td></td><td colspan="3">Note 1: This bit is cleared to 0 automatically by the internal process after the execution of the command</td></tr>
<tr><td></td><td colspan="3">Note 2: By synchronizing to the EEPROM read/write access, the subject control register is also updated.</td></tr>
</table>
</td></tr>
</table>

3. Camera Control Commands (The camera function modes: address 10H, 11H, 12H)

a. Normal Mode (90fps)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings		
										10H	11H	12H
Normal	90fps	OFF	Full Scanning					1.0	Internal	80H	A8H	00H
									External		28H	
								0.45	Internal		A8H	01H
									External		28H	
			Partial full scanning					1.0	Internal	88H	A8H	00H
									External		28H	
								0.45	Internal		A8H	01H
									External		28H	
			1/2 partial scanning					1.0	Internal		A9H	00H
									External		29H	
								0.45	Internal		A9H	01H
									External		29H	
			1/4 partial scanning					1.0	Internal		AAH	00H
									External		2AH	
								0.45	Internal		AAH	01H
									External		2AH	
			Variable partial scanning					1.0	Internal		AFH	00H
									External		2FH	
								0.45	Internal		AFH	01H
									External		2FH	
		ON	Full scanning					1.0	Internal	90H	A8H	00H
									External		28H	
								0.45	Internal		A8H	01H
									External		28H	
			Partial scanning					1.0	Internal	98H	A8H	00H
									External		28H	
								0.45	Internal		A8H	01H
									External		28H	
			1/2 partial scanning					1.0	Internal		A9H	00H
									External		29H	
								0.45	Internal		A9H	01H
									External		29H	
			1/4 partial scanning					1.0	Internal		AAH	00H
									External		2AH	
								0.45	Internal		AAH	01H
									External		2AH	
			Variable partial scanning					1.0	Internal		AFH	00H
									External		2FH	
								0.45	Internal		AFH	01H
									External		2FH	

b. Normal Mode (60fps)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings		
										10H	11H	12H
Normal	60fps	OFF	Full Scanning					1.0	Internal	80H	88H	00H
									External		08H	
								0.45	Internal		88H	01H
									External		08H	
			Partial full scanning					1.0	Internal	88H	88H	00H
									External		08H	
								0.45	Internal		88H	01H
									External		08H	
			1/2 partial scanning					1.0	Internal		89H	00H
									External		09H	
								0.45	Internal		89H	01H
									External		09H	
			1/4 partial scanning					1.0	Internal		8AH	00H
									External		0AH	
								0.45	Internal		8AH	01H
									External		0AH	
			Variable partial scanning					1.0	Internal		8FH	00H
									External		0FH	
								0.45	Internal		8FH	01H
									External		0FH	
		ON	Full scanning					1.0	Internal	90H	88H	00H
									External		08H	
								0.45	Internal		88H	01H
									External		08H	
			Partial scanning					1.0	Internal	98H	88H	00H
									External		08H	
								0.45	Internal		88H	01H
									External		08H	
			1/2 partial scanning					1.0	Internal		89H	00H
									External		09H	
								0.45	Internal		89H	01H
									External		09H	
			1/4 partial scanning					1.0	Internal		8AH	00H
									External		0AH	
								0.45	Internal		8AH	01H
									External		0AH	
			Variable partial scanning					1.0	Internal		8FH	00H
									External		0FH	
								0.45	Internal		8FH	01H
									External		0FH	

c. Normal Mode (30fps)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings 10H	11H	12H
Normal	30fps	OFF	Full Scanning					1.0	Internal	80H	C8H	00H
									External		48H	
								0.45	Internal		C8H	01H
									External		48H	
			Partial full scanning					1.0	Internal	88H	C8H	00H
									External		48H	
								0.45	Internal		C8H	01H
									External		48H	
			1/2 partial scanning					1.0	Internal		C9H	00H
									External		49H	
								0.45	Internal		C9H	01H
									External		49H	
			1/4 partial scanning					1.0	Internal		CAH	00H
									External		4AH	
								0.45	Internal		CAH	01H
									External		4AH	
			Variable partial scanning					1.0	Internal		CFH	00H
									External		4FH	
								0.45	Internal		CFH	01H
									External		4FH	
		ON	Full scanning					1.0	Internal	90H	C8H	00H
									External		48H	
								0.45	Internal		C8H	01H
									External		48H	
			Partial scanning					1.0	Internal	98H	C8H	00H
									External		48H	
								0.45	Internal		C8H	01H
									External		48H	
			1/2 partial scanning					1.0	Internal		C9H	00H
									External		49H	
								0.45	Internal		C9H	01H
									External		49H	
			1/4 partial scanning					1.0	Internal		CAH	00H
									External		4AH	
								0.45	Internal		CAH	01H
									External		4AH	
			Variable partial scanning					1.0	Internal		CFH	00H
									External		4FH	
								0.45	Internal		CFH	01H
									External		4FH	

d. Trigger Mode (90fps, Full scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings		
										10H	11H	12H
Trigger	90fps	OFF	Full scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	80H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
						Negative	Normal	1.0	Internal	C0H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
					V-Reset	Positive	Normal	1.0	Internal	81H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
						Negative	Normal	1.0	Internal	C1H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	A0H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
						Negative	Normal	1.0	Internal	E0H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
					V-Reset	Positive	Normal	1.0	Internal	A1H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
						Negative	Normal	1.0	Internal	E1H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	

e. Trigger Mode (90fps, Partial full scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings 10H	11H	12H
Trigger	90fps	OFF	Partial full scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	88H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
						Negative	Normal	1.0	Internal	C8H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
					V-Reset	Positive	Normal	1.0	Internal	89H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
						Negative	Normal	1.0	Internal	C9H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	A8H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
						Negative	Normal	1.0	Internal	E8H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
					V-Reset	Positive	Normal	1.0	Internal	A9H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
						Negative	Normal	1.0	Internal	E9H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	

f. Trigger Mode (90fps, 1/2 partial scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings		
										10H	11H	12H
Trigger	90fps	OFF	1/2 partial scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	88H	A1H	00H
									External		21H	
								0.45	Internal		A1H	01H
									External		21H	
							H reset	1.0	Internal		A1H	10H
									External		21H	
								0.45	Internal		A1H	11H
									External		21H	
						Negative	Normal	1.0	Internal	C8H	A1H	00H
									External		21H	
								0.45	Internal		A1H	01H
									External		21H	
							H reset	1.0	Internal		A1H	10H
									External		21H	
								0.45	Internal		A1H	11H
									External		21H	
					V-Reset	Positive	Normal	1.0	Internal	89H	A1H	00H
									External		21H	
								0.45	Internal		A1H	01H
									External		21H	
							H reset	1.0	Internal		A1H	10H
									External		21H	
								0.45	Internal		A1H	11H
									External		21H	
						Negative	Normal	1.0	Internal	C9H	A1H	00H
									External		21H	
								0.45	Internal		A1H	01H
									External		21H	
							H reset	1.0	Internal		A1H	10H
									External		21H	
								0.45	Internal		A1H	11H
									External		21H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	A8H	A1H	00H
									External		21H	
								0.45	Internal		A1H	01H
									External		21H	
							H reset	1.0	Internal		A1H	10H
									External		21H	
								0.45	Internal		A1H	11H
									External		21H	
						Negative	Normal	1.0	Internal	E8H	A1H	00H
									External		21H	
								0.45	Internal		A1H	01H
									External		21H	
							H reset	1.0	Internal		A1H	10H
									External		21H	
								0.45	Internal		A1H	11H
									External		21H	
					V-Reset	Positive	Normal	1.0	Internal	A9H	A1H	00H
									External		21H	
								0.45	Internal		A1H	01H
									External		21H	
							H reset	1.0	Internal		A1H	10H
									External		21H	
								0.45	Internal		A1H	11H
									External		21H	
						Negative	Normal	1.0	Internal	E9H	A1H	00H
									External		21H	
								0.45	Internal		A1H	01H
									External		21H	
							H reset	1.0	Internal		A1H	10H
									External		21H	
								0.45	Internal		A1H	11H
									External		21H	

g. Trigger Mode (90fps, 1/4 partial scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings 10H	11H	12H
Trigger	90fps	OFF	1/4 partial scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	88H	A2H	00H
									External		22H	
								0.45	Internal		A2H	01H
									External		22H	
							H reset	1.0	Internal		A2H	10H
									External		22H	
								0.45	Internal		A2H	11H
									External		22H	
						Negative	Normal	1.0	Internal	C8H	A2H	00H
									External		22H	
								0.45	Internal		A2H	01H
									External		22H	
							H reset	1.0	Internal		A2H	10H
									External		22H	
								0.45	Internal		A2H	11H
									External		22H	
					V-Reset	Positive	Normal	1.0	Internal	89H	A2H	00H
									External		22H	
								0.45	Internal		A2H	01H
									External		22H	
							H reset	1.0	Internal		A2H	10H
									External		22H	
								0.45	Internal		A2H	11H
									External		22H	
						Negative	Normal	1.0	Internal	C9H	A2H	00H
									External		22H	
								0.45	Internal		A2H	01H
									External		22H	
							H reset	1.0	Internal		A2H	10H
									External		22H	
								0.45	Internal		A2H	11H
									External		22H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	A8H	A2H	00H
									External		22H	
								0.45	Internal		A2H	01H
									External		22H	
							H reset	1.0	Internal		A2H	10H
									External		22H	
								0.45	Internal		A2H	11H
									External		22H	
						Negative	Normal	1.0	Internal	E8H	A2H	00H
									External		22H	
								0.45	Internal		A2H	01H
									External		22H	
							H reset	1.0	Internal		A2H	10H
									External		22H	
								0.45	Internal		A2H	11H
									External		22H	
					V-Reset	Positive	Normal	1.0	Internal	A9H	A2H	00H
									External		22H	
								0.45	Internal		A2H	01H
									External		22H	
							H reset	1.0	Internal		A2H	10H
									External		22H	
								0.45	Internal		A2H	11H
									External		22H	
						Negative	Normal	1.0	Internal	E9H	A2H	00H
									External		22H	
								0.45	Internal		A2H	01H
									External		22H	
							H reset	1.0	Internal		A2H	10H
									External		22H	
								0.45	Internal		A2H	11H
									External		22H	

h. Trigger Mode (90fps, Variable partial scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings 10H	11H	12H
Trigger	90fps	OFF	Variable partial scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	88H	A7H	00H
									External		27H	
								0.45	Internal		A7H	01H
									External		27H	
							H reset	1.0	Internal		A7H	10H
									External		27H	
								0.45	Internal		A7H	11H
									External		27H	
						Negative	Normal	1.0	Internal	C8H	A7H	00H
									External		27H	
								0.45	Internal		A7H	01H
									External		27H	
							H reset	1.0	Internal		A7H	10H
									External		27H	
								0.45	Internal		A7H	11H
									External		27H	
					V-Reset	Positive	Normal	1.0	Internal	89H	A7H	00H
									External		27H	
								0.45	Internal		A7H	01H
									External		27H	
							H reset	1.0	Internal		A7H	10H
									External		27H	
								0.45	Internal		A7H	11H
									External		27H	
						Negative	Normal	1.0	Internal	C9H	A7H	00H
									External		27H	
								0.45	Internal		A7H	01H
									External		27H	
							H reset	1.0	Internal		A7H	10H
									External		27H	
								0.45	Internal		A7H	11H
									External		27H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	A8H	A7H	00H
									External		27H	
								0.45	Internal		A7H	01H
									External		27H	
							H reset	1.0	Internal		A7H	10H
									External		27H	
								0.45	Internal		A7H	11H
									External		27H	
						Negative	Normal	1.0	Internal	E8H	A7H	00H
									External		27H	
								0.45	Internal		A7H	01H
									External		27H	
							H reset	1.0	Internal		A7H	10H
									External		27H	
								0.45	Internal		A7H	11H
									External		27H	
					V-Reset	Positive	Normal	1.0	Internal	A9H	A7H	00H
									External		27H	
								0.45	Internal		A7H	01H
									External		27H	
							H reset	1.0	Internal		A7H	10H
									External		27H	
								0.45	Internal		A7H	11H
									External		27H	
						Negative	Normal	1.0	Internal	E9H	A7H	00H
									External		27H	
								0.45	Internal		A7H	01H
									External		27H	
							H reset	1.0	Internal		A7H	10H
									External		27H	
								0.45	Internal		A7H	11H
									External		27H	

i. Trigger Mode (90fps, Binning, Full scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings 10H	Settings 11H	Settings 12H
Trigger	90fps	ON	Full scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	90H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
						Negative	Normal	1.0	Internal	D0H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
					V-Reset	Positive	Normal	1.0	Internal	91H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
						Negative	Normal	1.0	Internal	D1H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	B0H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
						Negative	Normal	1.0	Internal	F0H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
					V-Reset	Positive	Normal	1.0	Internal	B1H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
						Negative	Normal	1.0	Internal	F1H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	

j. Trigger Mode (90fps, Binning, Partial full scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings 10H	Settings 11H	Settings 12H
Trigger	90fps	ON	Partial full scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	98H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
						Negative	Normal	1.0	Internal	D8H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
					V-Reset	Positive	Normal	1.0	Internal	99H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
						Negative	Normal	1.0	Internal	D9H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	B8H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
						Negative	Normal	1.0	Internal	F8H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
					V-Reset	Positive	Normal	1.0	Internal	B9H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	
						Negative	Normal	1.0	Internal	F9H	A0H	00H
									External		20H	
								0.45	Internal		A0H	01H
									External		20H	
							H reset	1.0	Internal		A0H	10H
									External		20H	
								0.45	Internal		A0H	11H
									External		20H	

k Trigger Mode (90fps, Binning, 1/2 partial scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings 10H	11H	12H
Trigger	90fps	ON	1/2 partial scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	98H	A1H	00H
									External		21H	
								0.45	Internal		A1H	01H
									External		21H	
							H reset	1.0	Internal		A1H	10H
									External		21H	
								0.45	Internal		A1H	11H
									External		21H	
						Negative	Normal	1.0	Internal	D8H	A1H	00H
									External		21H	
								0.45	Internal		A1H	01H
									External		21H	
							H reset	1.0	Internal		A1H	10H
									External		21H	
								0.45	Internal		A1H	11H
									External		21H	
					V-Reset	Positive	Normal	1.0	Internal	99H	A1H	00H
									External		21H	
								0.45	Internal		A1H	01H
									External		21H	
							H reset	1.0	Internal		A1H	10H
									External		21H	
								0.45	Internal		A1H	11H
									External		21H	
						Negative	Normal	1.0	Internal	D9H	A1H	00H
									External		21H	
								0.45	Internal		A1H	01H
									External		21H	
							H reset	1.0	Internal		A1H	10H
									External		21H	
								0.45	Internal		A1H	11H
									External		21H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	B8H	A1H	00H
									External		21H	
								0.45	Internal		A1H	01H
									External		21H	
							H reset	1.0	Internal		A1H	10H
									External		21H	
								0.45	Internal		A1H	11H
									External		21H	
						Negative	Normal	1.0	Internal	F8H	A1H	00H
									External		21H	
								0.45	Internal		A1H	01H
									External		21H	
							H reset	1.0	Internal		A1H	10H
									External		21H	
								0.45	Internal		A1H	11H
									External		21H	
					V-Reset	Positive	Normal	1.0	Internal	B9H	A1H	00H
									External		21H	
								0.45	Internal		A1H	01H
									External		21H	
							H reset	1.0	Internal		A1H	10H
									External		21H	
								0.45	Internal		A1H	11H
									External		21H	
						Negative	Normal	1.0	Internal	F9H	A1H	00H
									External		21H	
								0.45	Internal		A1H	01H
									External		21H	
							H reset	1.0	Internal		A1H	10H
									External		21H	
								0.45	Internal		A1H	11H
									External		21H	

l. Trigger Mode (90fps, Binning, 1/4 partial scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings 10H	Settings 11H	Settings 12H
Trigger	90fps	ON	1/4 partial scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	98H	A2H	00H
									External		22H	
								0.45	Internal		A2H	01H
									External		22H	
							H reset	1.0	Internal		A2H	10H
									External		22H	
								0.45	Internal		A2H	11H
									External		22H	
						Negative	Normal	1.0	Internal	D8H	A2H	00H
									External		22H	
								0.45	Internal		A2H	01H
									External		22H	
							H reset	1.0	Internal		A2H	10H
									External		22H	
								0.45	Internal		A2H	11H
									External		22H	
					V-Reset	Positive	Normal	1.0	Internal	99H	A2H	00H
									External		22H	
								0.45	Internal		A2H	01H
									External		22H	
							H reset	1.0	Internal		A2H	10H
									External		22H	
								0.45	Internal		A2H	11H
									External		22H	
						Negative	Normal	1.0	Internal	D9H	A2H	00H
									External		22H	
								0.45	Internal		A2H	01H
									External		22H	
							H reset	1.0	Internal		A2H	10H
									External		22H	
								0.45	Internal		A2H	11H
									External		22H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	B8H	A2H	00H
									External		22H	
								0.45	Internal		A2H	01H
									External		22H	
							H reset	1.0	Internal		A2H	10H
									External		22H	
								0.45	Internal		A2H	11H
									External		22H	
						Negative	Normal	1.0	Internal	F8H	A2H	00H
									External		22H	
								0.45	Internal		A2H	01H
									External		22H	
							H reset	1.0	Internal		A2H	10H
									External		22H	
								0.45	Internal		A2H	11H
									External		22H	
					V-Reset	Positive	Normal	1.0	Internal	B9H	A2H	00H
									External		22H	
								0.45	Internal		A2H	01H
									External		22H	
							H reset	1.0	Internal		A2H	10H
									External		22H	
								0.45	Internal		A2H	11H
									External		22H	
						Negative	Normal	1.0	Internal	F9H	A2H	00H
									External		22H	
								0.45	Internal		A2H	01H
									External		22H	
							H reset	1.0	Internal		A2H	10H
									External		22H	
								0.45	Internal		A2H	11H
									External		22H	

m. Trigger Mode (90fps, Binning, Variable partial scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings 10H	Settings 11H	Settings 12H
Trigger	90fps	ON	Variable partial scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	98H	A7H	00H
									External		27H	
								0.45	Internal		A7H	01H
									External		27H	
							H reset	1.0	Internal		A7H	10H
									External		27H	
								0.45	Internal		A7H	11H
									External		27H	
						Negative	Normal	1.0	Internal	D8H	A7H	00H
									External		27H	
								0.45	Internal		A7H	01H
									External		27H	
							H reset	1.0	Internal		A7H	10H
									External		27H	
								0.45	Internal		A7H	11H
									External		27H	
					V-Reset	Positive	Normal	1.0	Internal	99H	A7H	00H
									External		27H	
								0.45	Internal		A7H	01H
									External		27H	
							H reset	1.0	Internal		A7H	10H
									External		27H	
								0.45	Internal		A7H	11H
									External		27H	
						Negative	Normal	1.0	Internal	D9H	A7H	00H
									External		27H	
								0.45	Internal		A7H	01H
									External		27H	
							H reset	1.0	Internal		A7H	10H
									External		27H	
								0.45	Internal		A7H	11H
									External		27H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	B8H	A7H	00H
									External		27H	
								0.45	Internal		A7H	01H
									External		27H	
							H reset	1.0	Internal		A7H	10H
									External		27H	
								0.45	Internal		A7H	11H
									External		27H	
						Negative	Normal	1.0	Internal	F8H	A7H	00H
									External		27H	
								0.45	Internal		A7H	01H
									External		27H	
							H reset	1.0	Internal		A7H	10H
									External		27H	
								0.45	Internal		A7H	11H
									External		27H	
					V-Reset	Positive	Normal	1.0	Internal	B9H	A7H	00H
									External		27H	
								0.45	Internal		A7H	01H
									External		27H	
							H reset	1.0	Internal		A7H	10H
									External		27H	
								0.45	Internal		A7H	11H
									External		27H	
						Negative	Normal	1.0	Internal	F9H	A7H	00H
									External		27H	
								0.45	Internal		A7H	01H
									External		27H	
							H reset	1.0	Internal		A7H	10H
									External		27H	
								0.45	Internal		A7H	11H
									External		27H	

n. Trigger Mode (60fps, Full scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings		
										10H	11H	12H
Trigger	60fps	OFF	Full scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	80H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
						Negative	Normal	1.0	Internal	C0H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
					V-Reset	Positive	Normal	1.0	Internal	81H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
						Negative	Normal	1.0	Internal	C1H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	A0H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
						Negative	Normal	1.0	Internal	E0H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
					V-Reset	Positive	Normal	1.0	Internal	A1H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
						Negative	Normal	1.0	Internal	E1H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	

o. Trigger Mode (60fps, Partial full scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings		
										10H	11H	12H
Trigger	60fps	OFF	Partial full scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	88H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
						Negative	Normal	1.0	Internal	C8H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
					V-Reset	Positive	Normal	1.0	Internal	89H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
						Negative	Normal	1.0	Internal	C9H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	A8H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
						Negative	Normal	1.0	Internal	E8H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
					V-Reset	Positive	Normal	1.0	Internal	A9H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
						Negative	Normal	1.0	Internal	E9H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	

p. Trigger Mode (60fps, 1/2 partial scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings 10H	11H	12H
Trigger	60fps	OFF	1/2 partial scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	88H	81H	00H
									External		01H	
								0.45	Internal		81H	01H
									External		01H	
							H reset	1.0	Internal		81H	10H
									External		01H	
								0.45	Internal		81H	11H
									External		01H	
						Negative	Normal	1.0	Internal	C8H	81H	00H
									External		01H	
								0.45	Internal		81H	01H
									External		01H	
							H reset	1.0	Internal		81H	10H
									External		01H	
								0.45	Internal		81H	11H
									External		01H	
					V-Reset	Positive	Normal	1.0	Internal	89H	81H	00H
									External		01H	
								0.45	Internal		81H	01H
									External		01H	
							H reset	1.0	Internal		81H	10H
									External		01H	
								0.45	Internal		81H	11H
									External		01H	
						Negative	Normal	1.0	Internal	C9H	81H	00H
									External		01H	
								0.45	Internal		81H	01H
									External		01H	
							H reset	1.0	Internal		81H	10H
									External		01H	
								0.45	Internal		81H	11H
									External		01H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	A8H	81H	00H
									External		01H	
								0.45	Internal		81H	01H
									External		01H	
							H reset	1.0	Internal		81H	10H
									External		01H	
								0.45	Internal		81H	11H
									External		01H	
						Negative	Normal	1.0	Internal	E8H	81H	00H
									External		01H	
								0.45	Internal		81H	01H
									External		01H	
							H reset	1.0	Internal		81H	10H
									External		01H	
								0.45	Internal		81H	11H
									External		01H	
					V-Reset	Positive	Normal	1.0	Internal	A9H	81H	00H
									External		01H	
								0.45	Internal		81H	01H
									External		01H	
							H reset	1.0	Internal		81H	10H
									External		01H	
								0.45	Internal		81H	11H
									External		01H	
						Negative	Normal	1.0	Internal	E9H	81H	00H
									External		01H	
								0.45	Internal		81H	01H
									External		01H	
							H reset	1.0	Internal		81H	10H
									External		01H	
								0.45	Internal		81H	11H
									External		01H	

q. Trigger Mode (60fps, 1/4 partial scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings		
										10H	11H	12H
Trigger	60fps	OFF	1/4 partial scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	88H	82H	00H
									External		02H	
								0.45	Internal		82H	01H
									External		02H	
							H reset	1.0	Internal		82H	10H
									External		02H	
								0.45	Internal		82H	11H
									External		02H	
						Negative	Normal	1.0	Internal	C8H	82H	00H
									External		02H	
								0.45	Internal		82H	01H
									External		02H	
							H reset	1.0	Internal		82H	10H
									External		02H	
								0.45	Internal		82H	11H
									External		02H	
					V-Reset	Positive	Normal	1.0	Internal	89H	82H	00H
									External		02H	
								0.45	Internal		82H	01H
									External		02H	
							H reset	1.0	Internal		82H	10H
									External		02H	
								0.45	Internal		82H	11H
									External		02H	
						Negative	Normal	1.0	Internal	C9H	82H	00H
									External		02H	
								0.45	Internal		82H	01H
									External		02H	
							H reset	1.0	Internal		82H	10H
									External		02H	
								0.45	Internal		82H	11H
									External		02H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	A8H	82H	00H
									External		02H	
								0.45	Internal		82H	01H
									External		02H	
							H reset	1.0	Internal		82H	10H
									External		02H	
								0.45	Internal		82H	11H
									External		02H	
						Negative	Normal	1.0	Internal	E8H	82H	00H
									External		02H	
								0.45	Internal		82H	01H
									External		02H	
							H reset	1.0	Internal		82H	10H
									External		02H	
								0.45	Internal		82H	11H
									External		02H	
					V-Reset	Positive	Normal	1.0	Internal	A9H	82H	00H
									External		02H	
								0.45	Internal		82H	01H
									External		02H	
							H reset	1.0	Internal		82H	10H
									External		02H	
								0.45	Internal		82H	11H
									External		02H	
						Negative	Normal	1.0	Internal	E9H	82H	00H
									External		02H	
								0.45	Internal		82H	01H
									External		02H	
							H reset	1.0	Internal		82H	10H
									External		02H	
								0.45	Internal		82H	11H
									External		02H	

r. Trigger Mode (60fps, Variable partial scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings 10H	11H	12H
Trigger	60fps	OFF	Variable partial scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	88H	87H	00H
									External		07H	
								0.45	Internal		87H	01H
									External		07H	
							H reset	1.0	Internal		87H	10H
									External		07H	
								0.45	Internal		87H	11H
									External		07H	
						Negative	Normal	1.0	Internal	C8H	87H	00H
									External		07H	
								0.45	Internal		87H	01H
									External		07H	
							H reset	1.0	Internal		87H	10H
									External		07H	
								0.45	Internal		87H	11H
									External		07H	
					V-Reset	Positive	Normal	1.0	Internal	89H	87H	00H
									External		07H	
								0.45	Internal		87H	01H
									External		07H	
							H reset	1.0	Internal		87H	10H
									External		07H	
								0.45	Internal		87H	11H
									External		07H	
						Negative	Normal	1.0	Internal	C9H	87H	00H
									External		07H	
								0.45	Internal		87H	01H
									External		07H	
							H reset	1.0	Internal		87H	10H
									External		07H	
								0.45	Internal		87H	11H
									External		07H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	A8H	87H	00H
									External		07H	
								0.45	Internal		87H	01H
									External		07H	
							H reset	1.0	Internal		87H	10H
									External		07H	
								0.45	Internal		87H	11H
									External		07H	
						Negative	Normal	1.0	Internal	E8H	87H	00H
									External		07H	
								0.45	Internal		87H	01H
									External		07H	
							H reset	1.0	Internal		87H	10H
									External		07H	
								0.45	Internal		87H	11H
									External		07H	
					V-Reset	Positive	Normal	1.0	Internal	A9H	87H	00H
									External		07H	
								0.45	Internal		87H	01H
									External		07H	
							H reset	1.0	Internal		87H	10H
									External		07H	
								0.45	Internal		87H	11H
									External		07H	
						Negative	Normal	1.0	Internal	E9H	87H	00H
									External		07H	
								0.45	Internal		87H	01H
									External		07H	
							H reset	1.0	Internal		87H	10H
									External		07H	
								0.45	Internal		87H	11H
									External		07H	

s. Trigger Mode (60fps, Binning, Full scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings 10H	11H	12H
Trigger	60fps	ON	Full scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	90H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
						Negative	Normal	1.0	Internal	D0H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
					V-Reset	Positive	Normal	1.0	Internal	91H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
						Negative	Normal	1.0	Internal	D1H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	B0H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
						Negative	Normal	1.0	Internal	F0H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
					V-Reset	Positive	Normal	1.0	Internal	B1H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
						Negative	Normal	1.0	Internal	F1H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	

t. Trigger Mode (60fps, Binning, Partial full scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings		
										10H	11H	12H
Trigger	60fps	ON	Partial full scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	98H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
						Negative	Normal	1.0	Internal	D8H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
					V-Reset	Positive	Normal	1.0	Internal	99H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
						Negative	Normal	1.0	Internal	D9H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	B8H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
						Negative	Normal	1.0	Internal	F8H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
					V-Reset	Positive	Normal	1.0	Internal	B9H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	
						Negative	Normal	1.0	Internal	F9H	80H	00H
									External		00H	
								0.45	Internal		80H	01H
									External		00H	
							H reset	1.0	Internal		80H	10H
									External		00H	
								0.45	Internal		80H	11H
									External		00H	

u. Trigger Mode (60fps, Binning, 1/2 partial scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings 10H	11H	12H
Trigger	60fps	ON	1/2 partial scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	98H	81H	00H
									External		01H	
								0.45	Internal		81H	01H
									External		01H	
							H reset	1.0	Internal		81H	10H
									External		01H	
								0.45	Internal		81H	11H
									External		01H	
						Negative	Normal	1.0	Internal	D8H	81H	00H
									External		01H	
								0.45	Internal		81H	01H
									External		01H	
							H reset	1.0	Internal		81H	10H
									External		01H	
								0.45	Internal		81H	11H
									External		01H	
					V-Reset	Positive	Normal	1.0	Internal	99H	81H	00H
									External		01H	
								0.45	Internal		81H	01H
									External		01H	
							H reset	1.0	Internal		81H	10H
									External		01H	
								0.45	Internal		81H	11H
									External		01H	
						Negative	Normal	1.0	Internal	D9H	81H	00H
									External		01H	
								0.45	Internal		81H	01H
									External		01H	
							H reset	1.0	Internal		81H	10H
									External		01H	
								0.45	Internal		81H	11H
									External		01H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	B8H	81H	00H
									External		01H	
								0.45	Internal		81H	01H
									External		01H	
							H reset	1.0	Internal		81H	10H
									External		01H	
								0.45	Internal		81H	11H
									External		01H	
						Negative	Normal	1.0	Internal	F8H	81H	00H
									External		01H	
								0.45	Internal		81H	01H
									External		01H	
							H reset	1.0	Internal		81H	10H
									External		01H	
								0.45	Internal		81H	11H
									External		01H	
					V-Reset	Positive	Normal	1.0	Internal	B9H	81H	00H
									External		01H	
								0.45	Internal		81H	01H
									External		01H	
							H reset	1.0	Internal		81H	10H
									External		01H	
								0.45	Internal		81H	11H
									External		01H	
						Negative	Normal	1.0	Internal	F9H	81H	00H
									External		01H	
								0.45	Internal		81H	01H
									External		01H	
							H reset	1.0	Internal		81H	10H
									External		01H	
								0.45	Internal		81H	11H
									External		01H	

v. Trigger Mode (60fps, Binning, 1/4 partial scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings 10H	11H	12H
Trigger	60fps	ON	1/4 partial scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	98H	82H	00H
									External		02H	
								0.45	Internal		82H	01H
									External		02H	
							H reset	1.0	Internal		82H	10H
									External		02H	
								0.45	Internal		82H	11H
									External		02H	
						Negative	Normal	1.0	Internal	D8H	82H	00H
									External		02H	
								0.45	Internal		82H	01H
									External		02H	
							H reset	1.0	Internal		82H	10H
									External		02H	
								0.45	Internal		82H	11H
									External		02H	
					V-Reset	Positive	Normal	1.0	Internal	99H	82H	00H
									External		02H	
								0.45	Internal		82H	01H
									External		02H	
							H reset	1.0	Internal		82H	10H
									External		02H	
								0.45	Internal		82H	11H
									External		02H	
						Negative	Normal	1.0	Internal	D9H	82H	00H
									External		02H	
								0.45	Internal		82H	01H
									External		02H	
							H reset	1.0	Internal		82H	10H
									External		02H	
								0.45	Internal		82H	11H
									External		02H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	B8H	82H	00H
									External		02H	
								0.45	Internal		82H	01H
									External		02H	
							H reset	1.0	Internal		82H	10H
									External		02H	
								0.45	Internal		82H	11H
									External		02H	
						Negative	Normal	1.0	Internal	F8H	82H	00H
									External		02H	
								0.45	Internal		82H	01H
									External		02H	
							H reset	1.0	Internal		82H	10H
									External		02H	
								0.45	Internal		82H	11H
									External		02H	
					V-Reset	Positive	Normal	1.0	Internal	B9H	82H	00H
									External		02H	
								0.45	Internal		82H	01H
									External		02H	
							H reset	1.0	Internal		82H	10H
									External		02H	
								0.45	Internal		82H	11H
									External		02H	
						Negative	Normal	1.0	Internal	F9H	82H	00H
									External		02H	
								0.45	Internal		82H	01H
									External		02H	
							H reset	1.0	Internal		82H	10H
									External		02H	
								0.45	Internal		82H	11H
									External		02H	

w. Trigger Mode (60fps, Binning, Variable partial scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings		
										10H	11H	12H
Trigger	60fps	ON	Variable partial scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	98H	87H	00H
									External		07H	
								0.45	Internal		87H	01H
									External		07H	
							H reset	1.0	Internal		87H	10H
									External		07H	
								0.45	Internal		87H	11H
									External		07H	
						Negative	Normal	1.0	Internal	D8H	87H	00H
									External		07H	
								0.45	Internal		87H	01H
									External		07H	
							H reset	1.0	Internal		87H	10H
									External		07H	
								0.45	Internal		87H	11H
									External		07H	
					V-Reset	Positive	Normal	1.0	Internal	99H	87H	00H
									External		07H	
								0.45	Internal		87H	01H
									External		07H	
							H reset	1.0	Internal		87H	10H
									External		07H	
								0.45	Internal		87H	11H
									External		07H	
						Negative	Normal	1.0	Internal	D9H	87H	00H
									External		07H	
								0.45	Internal		87H	01H
									External		07H	
							H reset	1.0	Internal		87H	10H
									External		07H	
								0.45	Internal		87H	11H
									External		07H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	B8H	87H	00H
									External		07H	
								0.45	Internal		87H	01H
									External		07H	
							H reset	1.0	Internal		87H	10H
									External		07H	
								0.45	Internal		87H	11H
									External		07H	
						Negative	Normal	1.0	Internal	F8H	87H	00H
									External		07H	
								0.45	Internal		87H	01H
									External		07H	
							H reset	1.0	Internal		87H	10H
									External		07H	
								0.45	Internal		87H	11H
									External		07H	
					V-Reset	Positive	Normal	1.0	Internal	B9H	87H	00H
									External		07H	
								0.45	Internal		87H	01H
									External		07H	
							H reset	1.0	Internal		87H	10H
									External		07H	
								0.45	Internal		87H	11H
									External		07H	
						Negative	Normal	1.0	Internal	F9H	87H	00H
									External		07H	
								0.45	Internal		87H	01H
									External		07H	
							H reset	1.0	Internal		87H	10H
									External		07H	
								0.45	Internal		87H	11H
									External		07H	

x. Trigger Mode (30fps, Full scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings		
										10H	11H	12H
Trigger	30fps	OFF	Full scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	80H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
						Negative	Normal	1.0	Internal	C0H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
					V-Reset	Positive	Normal	1.0	Internal	81H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
						Negative	Normal	1.0	Internal	C1H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	A0H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
						Negative	Normal	1.0	Internal	E0H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
					V-Reset	Positive	Normal	1.0	Internal	A1H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
						Negative	Normal	1.0	Internal	E1H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	

y. Trigger Mode (30fps, Partial full scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings		
										10H	11H	12H
Trigger	30fps	OFF	Partial full scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	88H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
						Negative	Normal	1.0	Internal	C8H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
					V-Reset	Positive	Normal	1.0	Internal	89H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
						Negative	Normal	1.0	Internal	C9H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	A8H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
						Negative	Normal	1.0	Internal	E8H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
					V-Reset	Positive	Normal	1.0	Internal	A9H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
						Negative	Normal	1.0	Internal	E9H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	

z. Trigger Mode (30fps, 1/2 partial scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings 10H	11H	12H
Trigger	30fps	OFF	1/2 partial scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	88H	C1H	00H
									External		41H	
								0.45	Internal		C1H	01H
									External		41H	
							H reset	1.0	Internal		C1H	10H
									External		41H	
								0.45	Internal		C1H	11H
									External		41H	
						Negative	Normal	1.0	Internal	C8H	C1H	00H
									External		41H	
								0.45	Internal		C1H	01H
									External		41H	
							H reset	1.0	Internal		C1H	10H
									External		41H	
								0.45	Internal		C1H	11H
									External		41H	
					V-Reset	Positive	Normal	1.0	Internal	89H	C1H	00H
									External		41H	
								0.45	Internal		C1H	01H
									External		41H	
							H reset	1.0	Internal		C1H	10H
									External		41H	
								0.45	Internal		C1H	11H
									External		41H	
						Negative	Normal	1.0	Internal	C9H	C1H	00H
									External		41H	
								0.45	Internal		C1H	01H
									External		41H	
							H reset	1.0	Internal		C1H	10H
									External		41H	
								0.45	Internal		C1H	11H
									External		41H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	A8H	C1H	00H
									External		41H	
								0.45	Internal		C1H	01H
									External		41H	
							H reset	1.0	Internal		C1H	10H
									External		41H	
								0.45	Internal		C1H	11H
									External		41H	
						Negative	Normal	1.0	Internal	E8H	C1H	00H
									External		41H	
								0.45	Internal		C1H	01H
									External		41H	
							H reset	1.0	Internal		C1H	10H
									External		41H	
								0.45	Internal		C1H	11H
									External		41H	
					V-Reset	Positive	Normal	1.0	Internal	A9H	C1H	00H
									External		41H	
								0.45	Internal		C1H	01H
									External		41H	
							H reset	1.0	Internal		C1H	10H
									External		41H	
								0.45	Internal		C1H	11H
									External		41H	
						Negative	Normal	1.0	Internal	E9H	C1H	00H
									External		41H	
								0.45	Internal		C1H	01H
									External		41H	
							H reset	1.0	Internal		C1H	10H
									External		41H	
								0.45	Internal		C1H	11H
									External		41H	

aa. Trigger Mode (30fps, 1/4 partial scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings 10H	11H	12H
Trigger	30fps	OFF	1/4 partial scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	88H	C2H	00H
									External		42H	
								0.45	Internal		C2H	01H
									External		42H	
							H reset	1.0	Internal		C2H	10H
									External		42H	
								0.45	Internal		C2H	11H
									External		42H	
						Negative	Normal	1.0	Internal	C8H	C2H	00H
									External		42H	
								0.45	Internal		C2H	01H
									External		42H	
							H reset	1.0	Internal		C2H	10H
									External		42H	
								0.45	Internal		C2H	11H
									External		42H	
					V-Reset	Positive	Normal	1.0	Internal	89H	C2H	00H
									External		42H	
								0.45	Internal		C2H	01H
									External		42H	
							H reset	1.0	Internal		C2H	10H
									External		42H	
								0.45	Internal		C2H	11H
									External		42H	
						Negative	Normal	1.0	Internal	C9H	C2H	00H
									External		42H	
								0.45	Internal		C2H	01H
									External		42H	
							H reset	1.0	Internal		C2H	10H
									External		42H	
								0.45	Internal		C2H	11H
									External		42H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	A8H	C2H	00H
									External		42H	
								0.45	Internal		C2H	01H
									External		42H	
							H reset	1.0	Internal		C2H	10H
									External		42H	
								0.45	Internal		C2H	11H
									External		42H	
						Negative	Normal	1.0	Internal	E8H	C2H	00H
									External		42H	
								0.45	Internal		C2H	01H
									External		42H	
							H reset	1.0	Internal		C2H	10H
									External		42H	
								0.45	Internal		C2H	11H
									External		42H	
					V-Reset	Positive	Normal	1.0	Internal	A9H	C2H	00H
									External		42H	
								0.45	Internal		C2H	01H
									External		42H	
							H reset	1.0	Internal		C2H	10H
									External		42H	
								0.45	Internal		C2H	11H
									External		42H	
						Negative	Normal	1.0	Internal	E9H	C2H	00H
									External		42H	
								0.45	Internal		C2H	01H
									External		42H	
							H reset	1.0	Internal		C2H	10H
									External		42H	
								0.45	Internal		C2H	11H
									External		42H	

ab. Trigger Mode (30fps, Variable partial scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings 10H	11H	12H
Trigger	30fps	OFF	Variable partial scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	88H	C7H	00H
									External		47H	
								0.45	Internal		C7H	01H
									External		47H	
							H reset	1.0	Internal		C7H	10H
									External		47H	
								0.45	Internal		C7H	11H
									External		47H	
						Negative	Normal	1.0	Internal	C8H	C7H	00H
									External		47H	
								0.45	Internal		C7H	01H
									External		47H	
							H reset	1.0	Internal		C7H	10H
									External		47H	
								0.45	Internal		C7H	11H
									External		47H	
					V-Reset	Positive	Normal	1.0	Internal	89H	C7H	00H
									External		47H	
								0.45	Internal		C7H	01H
									External		47H	
							H reset	1.0	Internal		C7H	10H
									External		47H	
								0.45	Internal		C7H	11H
									External		47H	
						Negative	Normal	1.0	Internal	C9H	C7H	00H
									External		47H	
								0.45	Internal		C7H	01H
									External		47H	
							H reset	1.0	Internal		C7H	10H
									External		47H	
								0.45	Internal		C7H	11H
									External		47H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	A8H	C7H	00H
									External		47H	
								0.45	Internal		C7H	01H
									External		47H	
							H reset	1.0	Internal		C7H	10H
									External		47H	
								0.45	Internal		C7H	11H
									External		47H	
						Negative	Normal	1.0	Internal	E8H	C7H	00H
									External		47H	
								0.45	Internal		C7H	01H
									External		47H	
							H reset	1.0	Internal		C7H	10H
									External		47H	
								0.45	Internal		C7H	11H
									External		47H	
					V-Reset	Positive	Normal	1.0	Internal	A9H	C7H	00H
									External		47H	
								0.45	Internal		C7H	01H
									External		47H	
							H reset	1.0	Internal		C7H	10H
									External		47H	
								0.45	Internal		C7H	11H
									External		47H	
						Negative	Normal	1.0	Internal	E9H	C7H	00H
									External		47H	
								0.45	Internal		C7H	01H
									External		47H	
							H reset	1.0	Internal		C7H	10H
									External		47H	
								0.45	Internal		C7H	11H
									External		47H	

ac. Trigger Mode (30fps, Binning, Full scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings 10H	11H	12H
Trigger	30fps	ON	Full scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	90H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
						Negative	Normal	1.0	Internal	D0H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
					V-Reset	Positive	Normal	1.0	Internal	91H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
						Negative	Normal	1.0	Internal	D1H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	B0H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
						Negative	Normal	1.0	Internal	F0H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
					V-Reset	Positive	Normal	1.0	Internal	B1H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
						Negative	Normal	1.0	Internal	F1H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	

ad. Trigger Mode (30fps, Binning, Partial full scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings 10H	11H	12H
Trigger	30fps	ON	Partial full scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	98H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
						Negative	Normal	1.0	Internal	D8H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
					V-Reset	Positive	Normal	1.0	Internal	99H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
						Negative	Normal	1.0	Internal	D9H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	B8H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
						Negative	Normal	1.0	Internal	F8H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
					V-Reset	Positive	Normal	1.0	Internal	B9H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	
						Negative	Normal	1.0	Internal	F9H	C0H	00H
									External		40H	
								0.45	Internal		C0H	01H
									External		40H	
							H reset	1.0	Internal		C0H	10H
									External		40H	
								0.45	Internal		C0H	11H
									External		40H	

ae. Trigger Mode (30fps, Binning, 1/2 partial scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings 10H	11H	12H
Trigger	30fps	ON	1/2 partial scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	98H	C1H	00H
									External		41H	
								0.45	Internal		C1H	01H
									External		41H	
							H reset	1.0	Internal		C1H	10H
									External		41H	
								0.45	Internal		C1H	11H
									External		41H	
						Negative	Normal	1.0	Internal	D8H	C1H	00H
									External		41H	
								0.45	Internal		C1H	01H
									External		41H	
							H reset	1.0	Internal		C1H	10H
									External		41H	
								0.45	Internal		C1H	11H
									External		41H	
					V-Reset	Positive	Normal	1.0	Internal	99H	C1H	00H
									External		41H	
								0.45	Internal		C1H	01H
									External		41H	
							H reset	1.0	Internal		C1H	10H
									External		41H	
								0.45	Internal		C1H	11H
									External		41H	
						Negative	Normal	1.0	Internal	D9H	C1H	00H
									External		41H	
								0.45	Internal		C1H	01H
									External		41H	
							H reset	1.0	Internal		C1H	10H
									External		41H	
								0.45	Internal		C1H	11H
									External		41H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	B8H	C1H	00H
									External		41H	
								0.45	Internal		C1H	01H
									External		41H	
							H reset	1.0	Internal		C1H	10H
									External		41H	
								0.45	Internal		C1H	11H
									External		41H	
						Negative	Normal	1.0	Internal	F8H	C1H	00H
									External		41H	
								0.45	Internal		C1H	01H
									External		41H	
							H reset	1.0	Internal		C1H	10H
									External		41H	
								0.45	Internal		C1H	11H
									External		41H	
					V-Reset	Positive	Normal	1.0	Internal	B9H	C1H	00H
									External		41H	
								0.45	Internal		C1H	01H
									External		41H	
							H reset	1.0	Internal		C1H	10H
									External		41H	
								0.45	Internal		C1H	11H
									External		41H	
						Negative	Normal	1.0	Internal	F9H	C1H	00H
									External		41H	
								0.45	Internal		C1H	01H
									External		41H	
							H reset	1.0	Internal		C1H	10H
									External		41H	
								0.45	Internal		C1H	11H
									External		41H	

af. Trigger Mode (30fps, Binning, 1/4 partial scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings 10H	11H	12H
Trigger	30fps	ON	1/4 partial scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	98H	C2H	00H
									External		42H	
								0.45	Internal		C2H	01H
									External		42H	
							H reset	1.0	Internal		C2H	10H
									External		42H	
								0.45	Internal		C2H	11H
									External		42H	
						Negative	Normal	1.0	Internal	D8H	C2H	00H
									External		42H	
								0.45	Internal		C2H	01H
									External		42H	
							H reset	1.0	Internal		C2H	10H
									External		42H	
								0.45	Internal		C2H	11H
									External		42H	
					V-Reset	Positive	Normal	1.0	Internal	99H	C2H	00H
									External		42H	
								0.45	Internal		C2H	01H
									External		42H	
							H reset	1.0	Internal		C2H	10H
									External		42H	
								0.45	Internal		C2H	11H
									External		42H	
						Negative	Normal	1.0	Internal	D9H	C2H	00H
									External		42H	
								0.45	Internal		C2H	01H
									External		42H	
							H reset	1.0	Internal		C2H	10H
									External		42H	
								0.45	Internal		C2H	11H
									External		42H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	B8H	C2H	00H
									External		42H	
								0.45	Internal		C2H	01H
									External		42H	
							H reset	1.0	Internal		C2H	10H
									External		42H	
								0.45	Internal		C2H	11H
									External		42H	
						Negative	Normal	1.0	Internal	F8H	C2H	00H
									External		42H	
								0.45	Internal		C2H	01H
									External		42H	
							H reset	1.0	Internal		C2H	10H
									External		42H	
								0.45	Internal		C2H	11H
									External		42H	
					V-Reset	Positive	Normal	1.0	Internal	B9H	C2H	00H
									External		42H	
								0.45	Internal		C2H	01H
									External		42H	
							H reset	1.0	Internal		C2H	10H
									External		42H	
								0.45	Internal		C2H	11H
									External		42H	
						Negative	Normal	1.0	Internal	F9H	C2H	00H
									External		42H	
								0.45	Internal		C2H	01H
									External		42H	
							H reset	1.0	Internal		C2H	10H
									External		42H	
								0.45	Internal		C2H	11H
									External		42H	

ag. Trigger Mode (30fps, Binning, Variable partial scanning)

Function Mode	Frame rate	Binnig	Scanning Method	Trigger Mode	Reset Mode	Trigger Polarity	Exposure Start Mode	Gamma	Sync System	Settings 10H	11H	12H
Trigger	30fps	ON	Variable partial scanning	Edge preset	Non-Reset	Positive	Normal	1.0	Internal	98H	C7H	00H
									External		47H	
								0.45	Internal		C7H	01H
									External		47H	
							H reset	1.0	Internal		C7H	10H
									External		47H	
								0.45	Internal		C7H	11H
									External		47H	
						Negative	Normal	1.0	Internal	D8H	C7H	00H
									External		47H	
								0.45	Internal		C7H	01H
									External		47H	
							H reset	1.0	Internal		C7H	10H
									External		47H	
								0.45	Internal		C7H	11H
									External		47H	
					V-Reset	Positive	Normal	1.0	Internal	99H	C7H	00H
									External		47H	
								0.45	Internal		C7H	01H
									External		47H	
							H reset	1.0	Internal		C7H	10H
									External		47H	
								0.45	Internal		C7H	11H
									External		47H	
						Negative	Normal	1.0	Internal	D9H	C7H	00H
									External		47H	
								0.45	Internal		C7H	01H
									External		47H	
							H reset	1.0	Internal		C7H	10H
									External		47H	
								0.45	Internal		C7H	11H
									External		47H	
				Pulse width	Non-Reset	Positive	Normal	1.0	Internal	B8H	C7H	00H
									External		47H	
								0.45	Internal		C7H	01H
									External		47H	
							H reset	1.0	Internal		C7H	10H
									External		47H	
								0.45	Internal		C7H	11H
									External		47H	
						Negative	Normal	1.0	Internal	F8H	C7H	00H
									External		47H	
								0.45	Internal		C7H	01H
									External		47H	
							H reset	1.0	Internal		C7H	10H
									External		47H	
								0.45	Internal		C7H	11H
									External		47H	
					V-Reset	Positive	Normal	1.0	Internal	B9H	C7H	00H
									External		47H	
								0.45	Internal		C7H	01H
									External		47H	
							H reset	1.0	Internal		C7H	10H
									External		47H	
								0.45	Internal		C7H	11H
									External		47H	
						Negative	Normal	1.0	Internal	F9H	C7H	00H
									External		47H	
								0.45	Internal		C7H	01H
									External		47H	
							H reset	1.0	Internal		C7H	10H
									External		47H	
								0.45	Internal		C7H	11H
									External		47H	

Revision

Rev	Date (D/M/Y)	Changes	Name	Notes
1.0	2/9/2008	New Document	Sam Aimono	

Sensor Technologies America, Inc.
1345 Valwood Pkwy, Suite 320
Carrollton, Texas 75006-6891
TEL (972) 481-9223 FAX (972) 481-9209
URL http://www.sentechamerica.com/

Sensor Technology Co., Ltd.
7F, Harada Center Building
9-17, Naka cho 4chrome
Atsugi-city, Kanagawa
243-0018 Japan
TEL +81-46-295-7061 FAX +81-46-295-7066
URL http://www.sentech.co.jp/

Taiwan Sensor Technology, Inc.
3F-6, No. 9, Aiguo W, Rd,. Jhong Jheng District
Taipei City 100, Taiwan, R.O.C.
TEL 886-2-2383-2331 FAX 886-2-2370-8775
EMAIL: sentech0501@yahoo.com.tw